

Value for Money and Policy Review of the Flood Risk Management Programme

Final Report

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Executive Summary

Following a 2004 review of the State's approach to flooding, the Government approved the recommendations of the Flood Policy Review Report. The Report recommended that, in addition to structural measures, non-structural measures to protect against flooding should be emphasised. Since the 2004 Policy Review, OPW has embarked on an ambitious programme of structural and non structural works and activities. The OPW commissioned Goodbody Economic Consultants to undertake a value-for-money review of the Flood Risk Management Programme, which was initiated in the period since the 2004 Review. This Programme comprises The Flood Relief Capital Works Sub-Programme and the Flood Policy Implementation Sub-Programme.

In 2007, a total of €34m was provided in the Estimates for the Public Service for the Flood Risk Management Programme, accounting for just over 5 per cent of the OPW's total budget.

The Flood Risk Management Programme has changed the emphasis of the work of the OPW to include non-structural as well as structural interventions aimed at minimising flood risks. It also embraces a proactive and catchment based approach to achieving this goal. This is likely to prove an effective and efficient approach to flood risk management in the long run. It is in keeping with strategy enunciated in the 2007 EU Floods Directive.

The Flood Risk Management Programme and the approach adopted within that Programme has been confirmed in a number of Government policy statements. Research and analysis undertaken has also confirmed the reality of climate change and the prospects for increased levels of flooding over the next fifty years when compared to the past. The Flood Risk Management Programme thus remains a highly relevant initiative.

The Flood Relief Capital Works Sub-Programme has not yet reached the levels of activity identified as necessary in the Flood Policy Review Group report. There is also a tendency for capital budgets to be under spent. There are a number of reasons for these outcomes. These include manpower deficiencies, the diversion of OPW resources to react to urgent issues and the relatively lengthy planning and design process for what are in many cases relatively low budget capital projects.

The Flood Policy Implementation Sub-Programme has, in general terms, not met the targets set for it. This is due to delays in recruiting the personnel necessary to advance the Programme elements. It would also appear that relatively ambitious targets were set at the outset. As additional personnel have now been recruited, it

may be expected that the Sub-programme will begin to deliver in a more substantial fashion in the short term.

The OPW adopts a number of approaches to project planning and implementation that promote value for money. These include a focus on non-structural initiatives, a strong project appraisal process and the synchronisation of projects with other local authority construction works. While there are concerns about the effectiveness of the Flood Relief Capital Works Sub-Programme, there is less concern about its efficiency.

Good project planning processes are normally followed by the OPW. However, not all elements of the planning process are always present.

The OPW exceeds Department of Finance requirements in relation to project appraisal in that all major projects, including those below the €30m threshold, are subject to a cost benefit analysis (CBA).

A number of recommendations to improve the operation of both sub-programmes are made as follows:

- There is a need to embed capital projects in a more fully specified programme structure;
- Current efforts to introduce a project prioritisation system in advance of completion of the CFRAM studies should be expedited.
- OPW should consider whether a dedicated and integrated project planning and implementation team should be established with a clear brief of driving the capital programme forward;
- As a short term measure and temporary measure, the OPW should augment its planning and administrative staff through the procurement of project management consultancy resources;
- Legislation to streamline OPW project planning processes should be given the highest priority;
- There is a need for OPW to formalise project planning procedures through a detailed project planning and implementation manual, which would be applied to major projects;
- Good project planning procedures would suggest that a formal Business Case approach be used to inform decision-making for major projects;
- With regard to Ex-Post Reviews, this will need to be extended to all projects in excess of €30m and to one in twenty of the remaining projects;
- A set of input, output and result/impact indicators should be developed for the Flood Relief Capital Works Sub-Programme;

- The output indicators for the Flood Policy Implementation Sub-Programme should be clearly specified and employed in a consistent fashion.

1. Background

1.1 Background and Objectives

Following a 2004 review of the State’s approach to flooding, the Government approved the recommendations of the Flood Policy Review Report. The Report recommended that, in addition to structural measures, non-structural measures to protect against flooding should be emphasised. Since the 2004 Policy Review, OPW has embarked on an ambitious programme of structural and non structural works and activities. The OPW commissioned Goodbody Economic Consultants to undertake a value-for-money review of the Flood Risk Management Programme, which was initiated in the period since the 2004 Review. A Steering Group, comprised of OPW officials was established to oversee the review.

This review was to be conducted in line with the Expenditure Review Initiative which was established in 1997 by the Department of Finance. There are four main elements in such reviews:

- A review of the objectives of the spending being reviewed;
- An evaluation of the effectiveness of programme spending;
- An evaluation of the efficiency of programme spending; and
- A review of the performance indicators being used.

1.2 Scope of the Study

OPW activities in relation to flood risk management embrace three disparate activities:

- The Flood Relief Capital Works Sub-Programme (structural aspects);
- The Flood Policy Implementation Sub-Programme (non-structural aspects); and
- The Arterial Drainage Maintenance Sub-Programme.¹

Initially, the scope of the value for money review was confined to the Flood Relief Capital Works Sub-Programme but was extended at the study inception stage to include the Flood Policy Implementation Sub-Programme. These two elements comprise the structural and non-structural activities aimed at implementing the strategy outlined in the Flood Policy Review Report. Taken together, they will be referred to as “the Flood Risk Management Programme” or “the Programme” throughout this report. The Arterial Drainage Maintenance

¹ The terminology used by OPW to reference these separate elements varies. We have adopted the above terminology in this report for the sake of consistency and clarity.

Sub-Programme, which provides for the maintenance of schemes completed under the 1945 and 1995 arterial drainage acts, was not included within the scope of the review.

In 2007, a total of €34.0m was provided in the Estimates for the Public Service for the Sub-programmes under review, with an additional €18.2m for the Arterial Drainage Maintenance Sub-Programme. The Sub-Programmes under review account for just over 5 per cent of the OPW's total budget.

1.3 Approach of the Consultants

The approach of the consultants was to interview the key OPW personnel charged with delivering the Flood Risk Management Programme (FRMP). This process centred on gaining an understanding of the content of the FRMP, the objectives and targets set and the progress made to date. As the post-Flood Review FRMP had a limited period in which to impact, there was also a focus on assessing the organisation of the Programme and its capacity to deliver in the future.

Similarly, it was recognised that capital works take considerable time to plan and implement. As such, expenditure on capital works during the period since 2004 bears little relation to capital projects completed during that period. Thus, there was a need to take a longer perspective on capital projects, so that the rate of output of the Programme, in so far as it relates to Flood Relief Capital Works, could be discerned. As part of this process, case studies of two capital projects for which planning commenced prior to 2004 but which were completed post 2004 were undertaken. These were the Tolka Valley and Carrick-on-Suir Flood Relief Schemes. The focus of the case studies was on determining whether these projects had been planned and implemented in accordance with best practice procedures.

The consultants also examined documentation relating to the inception of the Flood Risk Management Programme, its detailed programme of works, and the elements that constituted those works. Programme expenditure data were also obtained.

1.4 Layout of the Report

This Report is laid out as follows. Section 2 summarises the background to the Flood Risk Management Programme, focusing in particular of the Flood Policy Review Group recommendations. The components of the Programme are discussed in Section 3, which also considers the continuing relevance of the Programme. Section 4 assesses the progress made in implementing the Programme and its efficiency and effectiveness. The approach taken within

the Programme to project planning and implementation is reviewed in Section 5. Section 6 reviews the performance indicators used. Conclusions and recommendations are presented in Section 7.

2. Background to the Flood Risk Management Programme

2.1 Overview

This Section of the Report outlines the legislative and policy background to flood relief in Ireland. It begins with an overview of the legislation and relevant responsibilities of the primary agencies involved in flood relief and risk management. It summarises the findings and recommendations of the Flood Policy Review Group which reported in 2004.

2.2 Legislation and Responsibilities for Flood Relief in Ireland

There is no statutory duty on any State or other authority to prevent flooding, but there are a number of bodies with adequate powers to reduce the risk of flooding where this is deemed desirable.

The State discharges its role through a number of Departments and Offices:

- The Office of Public Works
- Local Authorities;
- The Department of the Environment, Heritage and Local Government; and
- The Department of Agriculture, Fisheries and Food.

However, to a major extent, flood relief in Ireland is co-ordinated and administered through the OPW in conjunction with Local Authorities.

2.2.1 The Office of Public Works

The statutory authority and responsibility of the OPW in relation to arterial drainage and flood relief arises primarily from the Arterial Drainage Acts of 1925 and 1945 and the Arterial Drainage (Amendment) Act, 1995.

Until the 1980s, the primary focus of flood relief activities in Ireland was to relieve chronically waterlogged and flooded agricultural land so as to make it more productive. Such schemes were implemented under the Arterial Drainage Act of 1945, which empowered the OPW to undertake such work, but only on a river basin-wide basis. By the year 2002, forty separate schemes, which benefited over 650,000 acres of flood damaged or waterlogged lands, had been carried out under the 1945 Act and these schemes continue to be maintained by the OPW. The Schemes completed under this legislation were catchment-based and, as such, had the additional benefit of providing an increased protection against flooding in urban areas within these catchments.

Since the mid 1980s, due to several factors, such as the impact of EU agricultural quotas and increasing agricultural productivity, the need to extend the area of agricultural land diminished. At the same time, localised flooding emerged as a major problem. The purpose of the Arterial Drainage (Amendment) Act 1995 was to empower the OPW to undertake works designed to relieve flooding in localized areas without having to undertake work throughout a river basin, as was the position under the 1945 Act. The amendment was first considered after serious flooding in 1990 and was enacted following the widespread flooding which occurred in the winter of 1994/1995. Rainfall in the period from late December 1994 to end of February 1995, in the West of Ireland in particular, was up to 250 per cent of normal, resulting in extensive flooding and damages in many urban and rural locations.

Following the passing of the 1995 Act, a priority programme of flood relief schemes was drawn up for nine areas around the country which suffered localised flooding on a regular basis. Other areas have been added to the list in the intervening years.

The legislation and Government policy provides for the following powers and duties of the OPW in relation to flooding:²

- Design and Build: The power to design, and subject to the approval of the Minister for Finance, to execute arterial drainage and flood relief schemes;
- Maintenance:
 - Responsibility for maintaining completed drainage and flood relief schemes which it has executed
 - The power to undertake maintenance of drainage districts where such maintenance is not being properly carried out by the responsible local authority;
- Consent: The OPW's consent is required for the construction of bridges;
- Compulsion: The power to require occupiers of land to restore, open up and repair any watercourse that discharges into an existing drainage district;
- The power to make compulsory drainage orders where the owner or occupier of lands withholds consent;
- Commissioners of Public Works (Functions and Powers) Act 1996 provides that the OPW has the power to make schemes or other arrangements for the provision of assistance, whether in the form of money, living accommodation, land or other property of any kind to persons who suffer injury or loss by reason of flooding;

² Report of the Flood Policy Review Group Section 2.2.3 pages 48-49

- The power to implement a range of non-structural flood risk management measures;
- International Co-Operation: The OPW represents Ireland at EU level and in discussion in relation to flood risk management, and also supports Ireland's participation in various international bodies.

2.2.2 Local Authorities

Local Authorities, in conjunction with the OPW, play a pivotal role in flood management. Most flood relief schemes are undertaken in conjunction with the relevant local authority. Local Authorities can promote the scheme and undertake preliminary studies, often with full or part funding from the OPW.

Two pieces of legislation are particularly relevant with regard to works aimed at reducing flood risk. The Planning and Development Act 2000 enables local authorities to provide in their Development Plans to prohibit, restrict, regulate or control development in areas at risk from flooding. The Local Authorities (Works) Act 1949 states that “Where a local authority is of the opinion that land or structures have sustained, or are likely to sustain, damage from flooding, landslide, subsidence or similar occurrence, the authority is enabled to carry out relief or protective works.” Works covered by this act include making drains, removal of obstructions and modification of watercourses, and construction of walls and embankments. In a number of cases the OPW has provided the funds for such work and in some cases carried out the work on behalf of the local authorities.

The Local Authorities (Works) Act, 1949 empowers local authorities to carry out relief or protective works with regard to flooding. More recently, in order to provide an emergency public consultation process in respect of urgently required works, Part 8 of the Planning and Development Regulations 2002 has been used, where an Environmental Impact Assessment is not required.

Other responsibilities and powers resting with local authorities are relevant to flood relief. Public Sewage and Drainage schemes may be constructed under the Sanitary Services Act. Although not directly intended to provide flood relief, the construction of such schemes can sometimes be combined with flood relief works to provide economic and environmental benefits. The Sanitary Services Act also empowers, but does not oblige, a sanitary authority to remove obstructions from rivers and watercourses. Many local authorities have a statutory responsibility for the maintenance of Drainage Districts under the Arterial Drainage Act of 1925 and previous legislation. However, there has been considerable variability in the frequency and thoroughness of the maintenance carried out in drainage districts and some districts have fallen into disrepair. Finally, local authorities are key agencies through which emergency response is

provided during and in the aftermath of flooding events, in conjunction with the Garda Siochana and the Health Service Executive.

2.2.3 The Department of the Environment, Heritage and Local Government

The Department of the Environment, Heritage and Local Government (DEHLG) has a direct role in flood management through its work in promoting legislation on environmental protection and planning and development, funding of urban drainage under the Water Services Programme and providing policy guidance and funding to Local Authorities. The DEHLG also plays a role in emergency response, and is charged with implementation of the Water Framework Directive in Ireland. The Minister is also responsible for conserving natural habitats, and in this regard the contribution of wetland ecosystems to flood attenuation is particularly important.

2.2.4 The Department of Agriculture Fisheries and Food

The Department of Agriculture, Fisheries and Food does not have a direct role in the prevention of flooding, but at the request of the Government, has allocated funds to alleviate difficulties arising from inclement weather and flooding which resulted in loss of crops or livestock or caused repeated flooding of farmyards.

In addition, as successor to the Land Commission, the Department administers a portion of the purchase money withheld from former estate owners for the upkeep of embankments on those estates. However, the amount of such funds is generally small and is generally insufficient to maintain the various embankments. The Department is not required to carry out any works to maintain or improve Land Commission works.

The Department is responsible for matters affecting coastline. Its powers are administered through the Coast Protection Act 1963 and the Foreshore Acts, 1993 and 2003. It also operates a coastal protection strategy in conjunction with local authorities.

2.3 Report of the Flood Policy Review Group (FPRG)

2.3.1 Background

In November 2002, the Minister of State at the Department of Finance announced a review of national flood policy and established a group of relevant stakeholders to conduct the review. The Review Group completed its work in

December 2003, and the findings were subsequently published in the *Report of the Flood Policy Review Group*³ (FPRG).

The Report sets out the policy, funding, structural and organisational difficulties that currently exist and makes recommendations to address these. It does not contain a detailed economic or engineering assessment of the issues as this was not deemed necessary for the purposes of the Review and would have delayed its completion.

The Review Group saw its recommendations on policy, organisation and funding as key to a holistic and effective State response to flooding in the future. These recommendations clarified the responsibilities of various State agencies in relation to flood risk management, both in terms of responding to flooding and, more importantly, for planning to avoid, or at least reduce, damage from flooding in the future.

The Report stated that the then current approach to flood management in Ireland was largely reactive and that the responsibilities of State agencies had evolved in a piecemeal fashion without the benefit of an integrated policy on flooding. The general thrust of the Report was that the relevant authorities should become more proactive in flood management, rather than merely responding with remedial measures.

The Report found that there was over concentration on structural flood defence works and insufficient emphasis on non-structural methods of flood management, such as planning controls and flood warning systems. The Group also identified a need to re-examine current expenditure on structural solutions (both maintenance of existing drainage schemes and construction of new flood defence schemes) to ensure that resources are prioritised to the areas of greatest need and that value for money is obtained.

2.3.2 Recommendations of the Flood Policy Review Group

The FPRG made specific recommendation in the areas of policy, operations, resources, legislation and research

Policy

- Future policy should seek to minimise the national level of exposure to flood damages through the identification and management of existing, and particularly potential future, flood risks in an integrated, proactive and river basin based manner;

³ Report of the Flood Policy Review Group (FPRG) – Office of Public Works

- The Office of Public Works was to be the lead agency in delivering this policy;
- A two-pronged approach to flood management was to be pursued with a greater level of importance attributed to non-structural flood relief measures supported, where necessary, by traditional structural flood relief measures;
- All future expenditure in the area of flood relief would need to satisfy strict prioritisation criteria;
- It was recommended that the option of administering future Programmes of Humanitarian Aid through established support networks under the aegis of the Department of Social and Family Affairs and/or Health Boards be examined;
- Current legislation under which the OPW and Local Authorities operate was viewed as restrictive and deficient in some aspects. The legislation should be reviewed to determine changes required in order to implement the new policy

Operational

- The OPW was to review immediately its current Flood Relief Work Programme to reassess the optimum balance between structural and non-structural measures;
- Based on clear prioritisation criteria, rivers, channels and defence assets were to be designated as priorities for maintenance and these would then be the responsibility of the OPW;
- For all non-designated channels, without prejudice to the ongoing responsibilities of riparian owners or other interested bodies, local authorities would provide emergency relief under the provisions of the Local Government (Sanitary Services) Act, 1948 or the Local Authorities (Works) Act, 1949;
- It was proposed that River Basin Flood Risk Management Plans (RBFMRPs) be developed.
- The OPW was to play an advisory role in the area of general planning and development control through the development of standards and guidelines in conjunction with DEHLG and local authorities for inclusion in Development Plans;
- It was recommended that comprehensive Flood Hazard Maps be developed and made available on the Internet.
- It was recommended that, following completion of the first phase of the Flood Hazard Mapping Programme, all information be made immediately available to DEHLG to inform future planning and development processes;

- An asset register of flood defences was to be developed for the purposes of risk identification and the determination of maintenance priorities and programmes;
- The application of flood warning systems was to be examined in conjunction with other non-structural flood impact mitigation measures.
- The development and management of a general flood awareness campaign would be most appropriately coordinated at a national level by the OPW;
- The OPW was to assume responsibility for flood management at locations where tidal and fluvial influences interface. Locations solely at risk of tidal flooding will remain the responsibility of the Department of Communications, Marine & Natural Resources;
- In its assessment of new capital projects the OPW should provide for measurement of environmental costs and benefits in its cost benefit methodologies. The OPW should also have regard to the value of wetland eco-systems in flood management;
- The OPW, in conjunction with the EPA, was to examine issues relating to the implementation of a strategic hydrometric monitoring programme
- The OPW was to examine the possibility of developing high-resolution (possibly national) Digital Terrain Models (DTMs) for hydrological and hydraulic modelling;
- The OPW was to examine the possibility of developing Information Technology (IT) systems and structures, including Geographical Information Systems (GIS), telemetry systems, data protocols, management structures and systems, etc. for the management of flood-related data and information;
- Programmes of necessary research were identified in the following areas:
 - Update of the Flood Studies Report and river basin (hydrological) modelling
 - Analysis of the potential impacts of climate change on flood frequency and severity
 - Meteorological forecasting techniques for flood warning systems
 - Systematic collation of all information on flood damage in Ireland
 - Socio-economic impact of flooding on Irish society
 - The possible use of wetlands for attenuation purposes.

2.3.3 Implementation

The Review Group noted that additional funding would be required to implement the new policy:

- €26 million – Non-Structural Costs (over 6-year period)
- €440 million – Capital Works (over 10-15 year period)

These figures did not include costs of additional staff, which will be required primarily in the OPW.

In memorandum ref. AR-2004/448, the Minister of Finance sought approval from the Government to publish the Report of the Flood Policy Review Group (FPRG) and to implement its recommendations. The Government Decision of 21st September 2004 provided this approval, and since then the report of the FPRG has formed the basis of Government policy on flood relief. In general terms, the policy towards flood relief was reactive prior to the publication of the FPRG report; but policy is now more proactive – particularly in the identification of flood risk. As noted above, the report made many specific recommendations for change, and the programme of work now underway within the OPW is largely responsible for implementing the recommendations of the Report.

3. The Flood Risk Management Programme

3.1 Introduction

This Section identifies the objectives of the Flood Risk Management Programme and the nature and scale of both the Capital Works and the Non-Capital Works undertaken as part of the Programme. It sets out the organisational structures within the OPW in those divisions responsible for delivery of the Programme. Finally, it discusses the importance of the new EU Floods Directive and examines the ongoing relevance of the Programme.

3.2 Objectives of the Programme

The OPW Statement of Strategy 2005-2008 establishes an overall goal for the Office in respect of its role in relation to flood risks. The overall goal is to “develop programmes and measures to implement flood risk management policy”. Within this overall goal, a number of objectives are set, which impinge on the Programme. The mostly directly relevant of these is to: “deliver on flood risk management programmes and projects (structural and non-structural flood relief measures)”.

Within this overall objectives framework, the objective for the Programme is further elaborated in the 2007 Engineering Services Business Plan as: “to minimise the national level of flood risk to homes, businesses and infrastructure through the identification and management of existing and, particularly, potential future flood risks in an integrated, pro-active and catchment based manner.” This objective captures the key elements of the changes in flood risk management policy on foot of the Review. In particular, it embraces structural and non-structural initiatives and emphasises a pro-active and anticipatory rather than reactive approach.

The Business Plan elaborates a number of key strategies to meet this objective:⁴

- Development and delivery of detailed work programmes to implement the recommendations of the Flood Policy Review Group focused on:
 - Development of a strategic information base;
 - Strengthening of national capacity in non-structural flood risk management; and
 - Enhancing management and processes for Programme delivery.

⁴ Engineering Services Business Plan and Work Programme, 2007

- Establish consultative frameworks and mechanisms to ensure co-ordination and consultation with relevant stakeholders and for improving information dissemination;
- Deliver cost-effective and environmentally and socially sustainable projects (structural and non-structural flood relief measures) to reduce flood risk; and
- Maintain an effective programme of maintenance of river courses drained under the provisions of the Arterial Drainage Acts.

3.3 Description of Structural Works under the Flood Relief Capital Works Sub-Programme

One finding of the FPRG Report was that there was over-concentration on structural flood defence works and insufficient emphasis on non-structural methods of flood management in the past. Nevertheless, the FPRG Report acknowledged that in many instances, structural engineering works are an appropriate response to resolve a flooding problem.

When capital works are to be undertaken, the OPW procure, either internally or through consultants, the necessary engineering, hydrological, environmental and other expert services needed to design a scheme and to take it through the statutory processes. As outlined in Section 2, such schemes are typically delivered using either the 1945 Act or 1995 (Amendment) Act when undertaken by the OPW, or under Part 8 of the planning regulations when undertaken by a Local Authority. In order to progress to construction, potential schemes must generally be cost-beneficial, and must satisfy environmental impact assessment criteria. Further details on the various project implementation models are provided in Section 5.

Structural measures normally considered as solutions for flood relief are briefly described below⁵:

- Flood containment – construction of walls, embankments, etc. in order to keep the river in its channel or in a designated flood area. Sluices and pumping may be required for tidal risk and low-lying areas
- Increasing flow capacity – increasing the conveyance capacity of the channel and/or structures through the lining, deepening, widening, realignment or maintenance of channels, or the addition, removal or modification of channel structures
- Retention / storage upstream – development of an area where floodwaters can be stored

⁵ From Report of the Flood Policy Review Group

- Diversion – this measure involves either the diversion of part of the flood flow (flood relief channel, by-pass channel) or the redirection of the entire river (full channel).

The Flood Policy Review Group indicated that they were aware of approximately 300 locations in Ireland that are susceptible to flooding to an extent that may give rise to damage. An accurate cost of addressing all of these areas was not available, but the Group estimated that the capital cost of the limited number of projects in the OPW's Flood Relief Work Programme in 2003 (twenty four in total) was €300m⁶. The Report also noted that if the additional schemes identified in the submission to the Group of the County and City Managers Association were included that this amount rose to €440m. They estimated that it would take 10 to 15 years to complete the full programme of works (i.e. all those included in the estimate of €440m).

The basis for undertaking many of the schemes that are currently in progress precedes the work of the Review Group. In the mid 1990s, Ove Arup Consultants undertook a scoping review and identified approximately 400 potential schemes. Following flooding events in the 1990s, and the passing of the 1995 Amendment Act, OPW recognised that it would not be practicable to find the resources, financial and staffing, to deal on demand with all the requests received to deal with the various localised flooding problems around the country. It was considered therefore that the available financial and other resources would be used to the best advantage by concentrating on those applications most in need. Government Decision S23929G of 14 March 1995 approved a list of nine areas which should receive immediate priority in terms of flood relief works.

The Flood Relief Capital Works Sub-Programme, which emerged from the deliberations of the Flood Policy Review Group, was not given a formal existence. That is, an explicit time bounded programme of works, with indicative budgets, outcomes and timelines was not developed. This, together with the short period since the initiation of the Sub-Programme, makes it difficult to assess both the effectiveness and the value for money of the activities undertaken.

3.4 Description of Non-Capital Works under the Flood Policy Implementation Sub-Programme

Following the adoption of the FPRG Report and its associated recommendations in 2004, the OPW were of the view that additional resources and a revised management structure were required to implement the new policy. An Implementation Plan was developed and was accepted in principle in March

⁶ Section 6.2, Table 6.7 and Appendix 15 of Report of the Flood Policy Review Group

2006.⁷ The plan outlined in that document now forms the basis upon which the new policies are being implemented. However, it should be recognised that, as the resources to implement the plan were subject to separate sanction by the Department of Finance, the resources allocated to implement it were not in line with the needs originally identified.

The plan deals with issues such as management structure, the programmes of work required, and the staff and financial resources needed to implement the policy. There are fifteen Work Programmes (WP1-15) currently being undertaken within the OPW in order to implement the new Government policy on flooding in terms of its non-structural aspects (the Flood Policy Implementation Sub-Programme). These are:

- WP 1: Flood Studies Update;
- WP 2: Strategic Hydro-Meteorological Review;
- WP 3: Research and Development Programme;
- WP 4: Flood Hazard Mapping Programme;
- WP 5: Flood Risk Management Planning Programme;
- WP 6: Flood Forecasting and Warning Programme;
- WP 7: Flood Emergency Response Development Programme;
- WP 8: Public Awareness and Preparedness Programme;
- WP 9: Planning and Development Management Programme;
- WP 10: High Risk Channel Designation Programme;
- WP 11: Prioritisation Systems;
- WP 12: Asset Management Programme;
- WP 13: Review of Legislation;
- WP 14: Communications Programme; and
- WP 15: OPW Flood Response Programme.⁸

⁷ Flood Policy Review: Overview Plan for Policy Implementation, March 2006

⁸ There are six more work programmes undertaken by the Office: WP 16 relates to the Flood Relief Capital Works Programme and WP 17 to the Drainage Maintenance Programme. WP18 is an Environmental Programme and WP 19 is a Hydrometric Programme. WP 20 relates to IT Strategy and Development and WP 21 relates to the Strategic Policy Development regarding the new EU Floods Directive.

Table 3.2: The Work Programmes of the Flood Policy Implementation Sub-Programme

Work Programme	Objective
WP 1: Flood Studies Update	The objectives of the Flood Studies Report Update Programme (referred to as the Flood Studies Update - FSU) is to review and revise the 1975 Flood Studies Report, making use of the significantly increased volume of hydrological data and improved analysis tools now available, and to provide stakeholders with improved datasets and methodologies for estimating flood flows. This work programme is in response to the research needs identified in the Flood Policy Review Report viz. that an updating of hydrological modelling and research to update the Flood Studies Report was required.
WP 2: Strategic Hydro-Meteorological Review	The objectives of this programme are to identify the long-term needs for flood-related hydrometeorological data in Ireland, and to plan and develop a network of gauging stations and associated monitoring and management systems that will meet these needs. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'The OPW ... to examine issues relating to the implementation of a strategic hydrometric monitoring programme'</i> .
WP 3: Research and Development Programme	The purpose of the Research and Development (R&D) Programme is to meet existing and future needs for information, methodologies in flood risk management operations, and to provide best available guidance on policy issues related to flood risk. This Work Programme is designed to support the overall implementation of the Policy, and specifically to address the recommendation within the Flood Policy Review Report that the OPW should develop information, information systems and provide for environmental aspects within flood risk management.
WP 4: Flood Hazard Mapping Programme	The objective of the Flood Hazard Mapping Programme (FHMP) is to identify areas of land at risk from flooding and disseminate this information in a clear, effective and efficient manner to provide the flood risk information necessary to empower the public and other stakeholders to make informed flood risk management decisions and to assist with development of other aspects of the Policy implementation. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'It is recommended that comprehensive flood hazard maps be developed and made available on the Internet'</i> . The Programme has been divided into two Phases: <ul style="list-style-type: none"> • Phase I involves the development of a web-based GIS for the storage, management and display of flood hazard information, and the collection, interpretation and verification of <u>historic</u> flood hazard data. • Phase II involves the systematic development of <u>predictive</u> flood hazard maps for selected areas, including urban areas and those that are, or are expected to become, under development pressure. This form of map, with defined probability, is that which will be of most use to the primary stakeholders.
WP 5: Flood Risk Management Planning Programme	The objective of the River Basin Flood Risk Management Planning Programme is to develop for River Basins throughout the country Flood Risk Management Plans (FRMPs), where a significant flood risk exists or could arise, that define existing and foreseeable flood hazards and risks within a catchment and the methods, mechanisms, policies and proposals for managing the hazards and risks in a sustainable, integrated, pro-active and holistic manner. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'... River Basin Flood Risk Management Plans ... should be developed'</i> .
WP 6: Flood Forecasting and Warning Programme	The objective of the Flood Forecasting and Warning Programme is to develop systems and processes that provide effective and timely warning of impending floods to the public and response authorities to minimise the impacts and damages caused. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'The application of flood warning systems is to be examined ...'</i> and that <i>'a greater level of importance (is to be) attributed to non-structural flood relief measures'</i> .

Table 3.2: The Work Programmes of the Flood Policy Implementation Sub-Programme

Work Programme	Objective
WP 7: Flood Emergency Response Development Programme	The objective of the Emergency Response Development Programme is to promote the development and implementation of effective flood emergency response and recovery plans by the Local Authorities to minimise the impacts and damages caused by flood events.
WP 8: Public Awareness and Preparedness Programme	The objective of the Public Awareness and Preparedness Programme is to promote the awareness of flood risk and appropriate preventative, preparatory and response activities among the public and businesses to minimise the impacts and damages caused by flood events. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'The development and management of a general flood awareness campaign would be most appropriately coordinated at a national level'</i> .
WP 9: Planning and Development Management Programme	The objective of the Planning and Development Control Programme is to develop the necessary policies and guidelines to ensure that future increases in flood risk through inappropriate development are avoided or minimised. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'The OPW will play an advisory role in the area of general planning and development control through the development of standards and guidelines in conjunction with DEHLG and local authorities for inclusion in Development Plans'</i> .
WP 10: High Risk Channel Designation Programme	<p>The objective of the channel designation process is to ensure that high-risk channels for which no State Authority currently has legislative responsibility from a flood management point of view are not left to degrade. The proposal as outlined in the Flood Policy Review is to designate high-risk channels and give permissive powers of maintenance to the central authority (OPW).</p> <p>This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'Based on clear prioritisation criteria, rivers, channels and defence assets will be designated as priorities for maintenance and these will be the responsibility of the OPW'</i>.</p>
WP 11: Prioritisation Systems	The objective of the Prioritisation of Expenditure Programme is to develop appropriate procedures to optimise the efficiency and effectiveness of OPW expenditure on flood risk management measures. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'All future expenditure in the area of flood relief will need to satisfy strict prioritisation criteria' and that 'In its assessment of new capital projects the OPW should provide for measurement of environmental costs and benefits in its cost benefit methodologies'</i> .
WP 12: Asset Management Programme	The objective of the Asset Database and Management Programme is to identify and assess the flood defence assets throughout the country in order to help identify and quantify flood risk, assess and develop appropriate risk management measures and enhance the management of the defence assets. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'An asset register of flood defences is to be developed for the purposes of risk identification and the determination of maintenance priorities and programmes'</i> .
WP 13: Review of Legislation	The objective of the Review of Legislation is to ensure that an appropriate legal framework exists to empower or require relevant organisations to effectively discharge duties or functions related to the new Policy and / or the implementation of the recommendations of the Review Report. This Work Programme is designed to implement the recommendation within the Flood Policy Review Report that <i>'... the legislation should be reviewed to determine changes required in order to implement the new policy'</i> .

Table 3.2: The Work Programmes of the Flood Policy Implementation Sub-Programme

Work Programme	Objective
WP 14: Communications Programme	The objective of the Communication Programme is to ensure that pertinent information is issued to relevant organisations and the public as appropriate in a clear and comprehensible manner.
WP 15: OPW Flood Response Programme	The objective of the OPW Flood Response Development Programme is to enhance and promote preparedness within the OPW for floods, and hence optimise the use of resources in responding to, and recovering from, flood events.

3.5 Administrative and Engineering Structures

The OPW discharges its duty as the Government’s lead agency in relation to flood risk management and flood relief policy through the Administration Unit and Engineering Services Division.

The Administration Unit is responsible for Management and Administration of Flood Relief Projects, Overall Management and Administration of the Flood Management Programme, Management of the Arterial Drainage Maintenance programme and general administration within the Business Unit. Financial management lies with the administration unit.

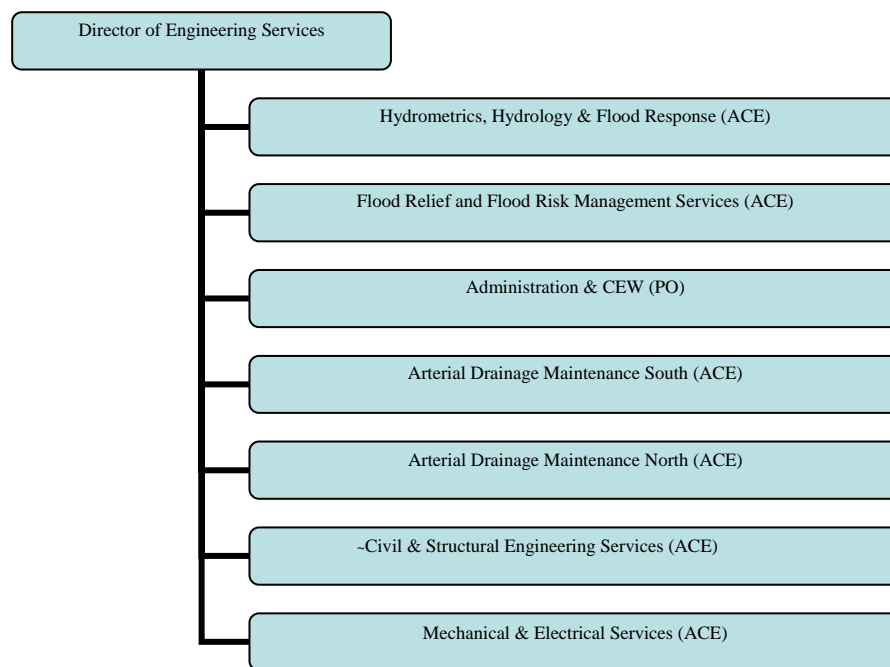
The Engineering Services Division provides technical expertise to support the Programme. It also provides unrelated professional engineering services in civil, structural, mechanical and electrical engineering to deliver on other Government policies and on the OPW’s work programmes. The present structure of the Engineering Services Division is as shown in Figure 3.1. The Director of Engineering Services heads the Service. The Service is further segmented into seven specialised divisions, each of which is managed by one of six Assistant Chief Engineers(ACE) and a Principal Officer (PO). There is a proposal to assign an additional PO to the Section.

The first five of the divisions shown in Figure 3.1 have responsibilities for elements of the Programme, and the head of each of these five divisions is responsible for one or more of the 15 work programmes for change currently underway within engineering services. The planning of the Flood Relief Capital Works Sub-Programme up to public exhibition stage is the responsibility of the Administration Unit, supported by the Flood Relief and Risk Management Services Division, with detailed design, procurement and implementation responsibilities residing with either arterial Drainage Maintenance South or North as appropriate.

As mentioned, the last two divisions of Engineering Services play a minor role in flood relief. The Civil & Structural Engineering Services Division provides engineering consultancy to Engineering Services, other Services sections of the OPW and to other Government Departments. The engineers in the section operate as part of the design team on a project in a similar way as consultant engineers. They are involved in major projects, from the preparatory stage until the completion of site operations. The Mechanical and Electrical Services Division provides much the same service in their speciality to the same group of clients.

The allocation of responsibilities for each of the work programmes is shown in Figure 3.1. The rationale for this allocation is best understood in the context of the general duties of each of the five divisions.

Figure 3.1: Organisational Chart for Engineering Services Division



Hydrometrics, Hydrology and Flood Response Services deliver services through two Sections. (i) The Hydrometric Section which provides hydrometric data and hydrological analysis for flood relief and arterial drainage services in the OPW and to external sources in the public sector, private sector and

academia. (ii) The newly established Hydrology and Flood Response Section that was formed for the management of flood related issues in the area of research and development, emergency response and forecasting.

Flood Relief and Risk Management Services is another newly formed division established to provide design and advisory services for the technical aspects of the implementation of the national flood management policy, including the capital flood relief programme. It comprises two sections: (i) The Flood Relief Design Section that provides a technical design and advisory service on matters relating to flood relief and also has responsibilities for the development of detailed flood forecasting systems. (ii) The Flood Risk Assessment and Management Section which is responsible for the Flood Risk Management Planning Programme, which includes the assessment of flood risk and the preparation of management plans in partnership with Local Authorities. The Section is also responsible for the national Flood Hazard Mapping Programme, including management of the new flood hazard mapping website, and the Planning and Development Management Programme, which is aimed at promoting appropriate consideration of flood risk within the planning process.

The Administration Unit is responsible for the overall management and administration of the flood risk management and flood relief programme. It coordinates the annual estimates, monitors expenditure vis-à-vis allocations, and prepares briefing material for the Chairman and Minister of State. It also coordinates responses to draft legislation and communications from outside bodies and the public. It provides general support and advice within the Business Unit in relation to financial, contractual, procedural and regulatory matters.

Arterial Drainage Maintenance Divisions North and South are responsible for the management of the maintenance requirements on schemes completed under the 1945 Drainage Act and the 1995 Arterial Drainage (Amendment) Act. They also provide professional advice for flood related matters under the 1995 Arterial Drainage (Amendment) Act. The services are delivered from regional offices in Trim, Headford and Limerick and the south east. A mechanical engineering section provides an expert plant management consultancy service. The Environment section provides professional advice and assistance to the Arterial Drainage Maintenance Service enabling it to accommodate environmental interests in conjunction with drainage and flood alleviation requirements in its works programme while ensuring its operations are carried out in accordance with existing EU and Irish Environmental Legislation. It also provides a service to other sections of the OPW on request.

3.6 The New EU Floods Directive

On the 26 November 2007, the EU Floods Directive (*Directive 2007/60/EC*) on the assessment and management of flood risks entered into force. The purpose of this Directive is “*to establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community.*”

The EU Commission has stated⁹ that between 1998 and 2007, floods in Europe have caused more than 700 deaths, have displaced more than half a million people and have caused more than €25 billion of damage. Furthermore, major flooding in 2002, 2005 and 2007 have confirmed Europe's increased susceptibility to floods and reinforced the need for action.

The new Directive requires Member States to assess which areas are potentially at significant risk from flooding, to map the flood extent and assets and humans at risk in these areas and to prepare plans setting out flood risk management objectives and measures to achieve these objectives. The Directive also reinforces the rights of the public to access this information and to have a say in the planning process.

The new Floods Directive is an addition to the European Union's existing water legislation. In particular, the Directive will be implemented in coordination with the Water Framework Directive, notably by flood risk management plans and river basin management plans being coordinated, and through coordination of the public participation procedures in the preparation of these plans. All assessments, maps and plans prepared are to be made available to the public.

Implementation of the new Directive is a three-phase process. Under Phase 1, the Directive requires Member States to first carry out a preliminary assessment by 2011 to identify the areas potentially at significant risk of flooding. It applies to all types of floods whether they originate from rivers and lakes, or occur in urban and coastal areas, or arise as a result of storm surges and tsunamis, with the possible exception of floods from sewerage systems

Following upon the preliminary assessment of Phase 1, each Member State must, in Phase 2, develop flood hazard maps and flood risk maps by 2013. The maps are to identify areas, which could be flooded during events of high, medium and low probability. The maps will also need to include details such as expected water depths or levels, economic activities that could be affected, the

⁹ EU Press Release Environment: Directive on flood risk management comes into force Reference: IP/07/1766 on 26/11/2007

numbers of inhabitants at risk and infrastructure that has the potential to cause environmental damage if flooded.

At the last stage, Member States are required to produce flood risk management plans by 2015 which are focused on prevention, protection and preparedness. The plans are to include measures to achieve the defined flood risk management objectives for the area. These measures might include those focussed on preventing unsustainable land use practices by discouraging, for example, building in flood-prone areas. The plans might also define measures to protect flood prone areas from the likelihood of floods and for reducing their potential impact by restoring flood plains or wetlands. Another important aspect of the flood risk management plans is the need to prepare the public for flood events.

3.7 Relevance of the Flood Risk Management Programme

The existing flood relief and management programme was formulated based on the findings and recommendations of the FPRG's work in 2003, which became Government policy in 2004.

The recommendations for a proactive, river basin based approach to flood risk management have now become a requirement under the newly adopted EU Floods Directive, and in this regard many of the policy, operational, legislative and research recommendations of the FPRG Report are now essential to fulfilling Ireland's obligations under the Directive. However, a critical aspect is whether the scale of investment foreseen at the time of the report can continue to be justified i.e. does the risk of flooding and the associated economic, social and environmental costs foreseen at the time of the Flood Relief Group's determinations still exist. A review of recent work on the impact of climate change in Ireland suggests that the risk is even higher than that foreseen several years ago.

The *National Climate Change Strategy for Ireland* published in 2000, outlined the threat posed by climate change globally, and more specifically to Ireland. It also outlined a framework for the action that is necessary to meet Ireland's climate change commitment under international agreements. The report noted that *"Ireland could experience higher winter rainfall with more severe flooding, lower summer rainfall and water shortages, rising sea levels, accelerated coastal erosion, loss of bog land, and threats to agriculture due to additional pests and diseases"*

The Report went on to provide examples of the projected impacts in Ireland, based on scenarios generally within the range predicted in the IPCC Second Assessment Report (1995). Many of the most severe impacts related to flooding:

- Significant increases in winter rainfall, with the average winter water levels in rivers, lakes and soils higher than at present, and with serious flooding more frequent. Areas now subject to flooding would suffer flooding of greater severity and duration; areas currently flood-free would suffer occasional floods.
- Rising sea levels and more storm events and storm surges, particularly on the West Coast, with storms of a greater severity; approximately 176,000ha (2.5 per cent of the land area of the State) are at risk from rising sea levels, including related erosion, flooding and environmental change. The most significant problem in this regard is the impact of storms, where even under conditions of slight sea-level rise, the statistical recurrence of extreme events associated with storms falls dramatically. Within a lifetime, an extreme weather event, which in 1990 might be expected to occur every 100 years, might be expected to occur every 5 years.
- Most of the area likely to be affected is on the West Coast, but the most vulnerable areas are likely to be on the East Coast.
- Areas of the coast subject to human development would be most at risk, and could suffer loss of infrastructure. Human use of the coast is quite intensive, and low lying areas of all coastal cities are highly developed with several key industries (energy, chemicals), sea-related activities (ports), and residential development under potential threat.

The 2002 report, *Climate Change: Indicators for Ireland*¹⁰ shows climate change-associated trends are evident in the meteorological and ecological records. These include increasing average temperature, changes in rainfall patterns and a lengthening of the growing season.

The 2003 report, *Climate Change: Scenarios and Impacts for Ireland*¹¹ assessed the possible magnitude and likely impacts over the 21st century by establishing scenarios for future Irish climatic conditions. The scenarios were based on statistical downscaling of global climate model projections for the middle and last quarter of the century, and using projections to assess probable impacts on key sectors. In relation to water resource management, the Report concluded that long term planning strategies will be necessary to adapt to adverse impacts. By anticipating change, it may be possible to implement adaptation strategies that minimise adverse impacts and maximize the positive aspects of climate change.

The report posits specific scenarios that suggest significant climate change can be anticipated in Ireland over the next half century. These scenarios include “pressures on the water supply infrastructure in the greater Dublin area, the

¹⁰ Prepared for the Environmental Protection Agency by the Department of Geography, National University of Ireland (Maynooth) and Department of Botany, Trinity College Dublin.

¹¹ Prepared for the Environmental Protection Agency by the National University of Ireland (Maynooth)

likelihood of increased frequency of flooding in the West, general effects to the marine environment as a result of higher water temperatures, threats to the coastline due to higher sea levels, and general threats to ecosystems and biodiversity.”

A further study published in 2005, *Climate Change: Regional climate model predictions for Ireland*,¹² provides an analysis of future Irish climate conditions for the period 2021-2060 using a regional climate model. The study applies data from this model to assess the impact of climate change on river discharge and local flooding in the Suir catchment area. One of the conclusions of applying the model in this way is that a predicted increase in winter rainfall was found to increase the risk of future flooding in the area. Other conclusions from the study included the finding that rainfall in June will decrease by about 10% compared to the present while December values show increases in the range of 10-25%.

In 2006, the Department of the environment undertook a *Review of the National Climate Change Strategy*. The consultation paper published in that regard noted that *“The Irish climate is experiencing changes which have been found to be consistent with those occurring at a global scale and there is increasing confidence that these changes are largely attributable to global warming.”*

In the *National Climate Change Strategy 2007 – 2012* published in April 2007, the Government placed adaptation measures that dealt with flooding at the heart of its strategy. In addition, it reiterated its support for the existing programme, formulated on the Flood Policy Review Group’s findings:

“The 2004 report of the Flood Policy Review Group recognised the need to devise a clearly defined and comprehensive policy approach to flooding nationally and a precise definition of the roles and responsibilities of the various stakeholders involved. Climate change is identified as one of the important elements that need to be addressed when assessing future flood relief measures in Ireland.

Following the report, the Government appointed the Office of Public Works as the lead agency to implement flooding policy in Ireland and the OPW is currently developing a strategy to manage flood risk in conjunction with other relevant state agencies.

Local Authorities now have the power to consider adaptation initiatives in relation to their development plans. The Planning and Development Act 2000, empowers planning authorities to provide, in their development plans, that development in areas at risk of flooding may be regulated, restricted or controlled.

¹² Prepared by the Community Climate Change Consortium for Ireland (C4I)

If development is proposed in a flood-risk area, the risk of flooding can be carefully evaluated and planning permission refused, if necessary.

As part of a comprehensive policy position on climate change, the Government is committed to developing a national adaptation strategy over the next two years. This strategy will provide a framework for the integration of adaptation issues into decision-making at national and local level.”

3.8 Market Failure and Flood Risk Management

It is obvious from the above that the need to address flood risks is becoming more pressing. The terms of reference for value-for-money reviews requires an assessment of the extent to which the Programme warrants the allocation of public funds on a current and ongoing basis. Given the need to mitigate risks, the issue is one of whether these risks can be mitigated through private actions or require government intervention.

Government intervention is justified where there is market failure. If an adequate private flood risk insurance market could be developed, then it could be argued that Government should not intervene. In practice, however, it is impossible to maintain a fully functioning insurance market. Only those property owners that are aware of their being exposed to severe and or frequent floods may consider purchasing insurance. This renders insurance of these risks un-commercial. While the insurance industry may attempt to preserve commerciality by bundling flood risks with other property related risks, this approach can break down in the face of severe flooding events. The result is that some property owners may find themselves uninsurable.

Even if a fully functioning insurance market could be maintained, this may be a second best solution. That is, the insurance system may not provide appropriate signals to property owners to take actions to mitigate the risks to which they are exposed. Additionally, actions taken by individuals to mitigate the risks to them, such as flood protection works, may have negative or positive spillover effects on property owners in the same river basin. In either case, the level of private intervention to mitigate risks will be sub-optimal from a viewpoint of society as a whole. Flood risk management is thus an area in which government will have to continue to play a substantial role.

3.9 Conclusions

The Flood Risk Management Programme has changed the emphasis of the work of the OPW to emphasise non-structural as well as structural interventions aimed at minimising flood risks. It also embraces a proactive and catchment based

approach to achieving this goal. This is likely to prove an effective and efficient approach to flood risk management in the long run. It is in keeping with strategy enunciated in the 2007 EU Floods Directive.

The Flood Risk Management Programme and the approach adopted within that Programme has been confirmed in a number of Government policy statements. Research and analysis undertaken has also confirmed the reality of climate change and the prospects for increased levels of flooding over the next fifty years when compared to the past. The Flood Risk Management Programme thus remains a highly relevant initiative.

4. The Flood Risk Management Programme: Progress, Effectiveness and Efficiency

4.1 Introduction

This Section of the report assesses the progress made under the Flood Relief Capital Works and Flood Policy Implementation Work Sub-Programmes and their effectiveness and efficiency.

4.2 The Flood Relief Capital Works Sub-Programme

4.2.1 Introduction

Major flood relief schemes take many years to conceive, reach agreement with stakeholders, advance through the planning process and to construct and complete. This means that, if any short period is considered, relatively few schemes will be brought to completion. As a result, this sub-section first looks at a longer term perspective, before detailing the outputs achieved since 2004. Consideration of the issues surrounding project planning and implementation are deferred to Section 5 of this Report.

4.2.2 Historical Progress in Implementing Flood Relief Capital Works

The first localised flood relief scheme carried out by the OPW on behalf of the Government under the Arterial Drainage (Amendment) Act 1995 was commenced in 1996. Between 1996 and 2007 inclusive, total expenditure on capital projects amounted to €136m, in nominal terms (see Table 4.1). Expenditure on capital projects has increased from relatively low levels in the immediate aftermath of the 1995 Act to exceed €10m by 2000. Expenditure has varied considerably in the intervening years, with a peak of €20m in 2003 and lower levels of spend in the period up to 2007, when a total of €23.1m was spent.. This variability reflects the phasing of works, with higher levels of expenditure occurring in years when significant schemes were under construction. For example, the River Nore (Kilkenny) scheme accounted for €9.7m of the total of €15.4m spent in 2004, and tended to dominate total spending in the years when it was under construction.

It is important to note that the expenditure figures include expenditure on elements that are not wholly directly related to individual flood relief projects, but are relevant to the planning of capital projects as a whole. These elements are flood hazard mapping and strategic information development. In some years, they account for a significant proportion of expenditure. For example, in 2006, some €2.6m of a total of €4.2m was spent on these elements.

Twenty four schemes have been completed since 1998, with twelve of these implemented by the OPW. However, as is made clear from Table 4.2, many of these are relatively minor in terms of expenditure. The schemes implemented by local authorities have not tended to be larger in expenditure terms.

Table 4.1: Total Expenditure on Flood Relief Capital Works (1996-2006)

Year	Budget Estimate (€m)	Outturn Expenditure (€m)
1996	2.2	1.4
1997	5.7	3.2
1998	5.1	4.7
1999	6.0	3.6
2000	12.7	5.3
2001	12.1	10.8
2002	14.4	17.7
2003	20.0	20.5
2004	20.6	15.4
2005	20	16.2
2006	20	14.2
2007	32	23.1.
Total	170.8	136.1

Source: Engineering Services - Office of Public Works

Table refers to total H2 Expenditure since 1996. All of H2 expenditure is referred to as capital expenditure and includes expenditure on both schemes and planning elements necessary for scheme development.

It is clear from Table 4.1 that, over the period 1996-2007, flood relief capital works have tended to suffer from under spending. During that period, a total of €170.8m was budgeted for the capital programme, so that the outturn of €136.1m represents a short fall of 20.3 per cent. When the Sub-Programme commenced in 1996, there were relatively few projects in the pipeline and the skilled resources required to plan further projects had to be built up. As a result, when the budget expanded through the late 1990s, expenditure lagged behind. The underspending came to an end in 2002-2003, when the expenditure exceeded the budget marginally for the first time. This was due to the initiation of the Kilkenny scheme, which proved to be more expensive than anticipated.

However, in the following period, a budget of c. €20m was set but expenditure continued to lag behind until 2007 when an expenditure level of €23m was achieved. However, in that year, Government increased the budget to €32m, so

Table 4.2: Flood Relief Schemes Directly Implemented by OPW since 1998

Year	Completion Date	Expenditure €m
Mulkear River, Newport, Co. Tipperary	1998	3.85
Nanny River, Duleek, Co. Meath	1998	2.25
Sixmilebridge, Co. Clare	1997	0.40
Gort Town, Bridge Street, Galway	1997	0.34
Lacken (Ardrahan), Galway	1997	0.09
Mulkear River, Cappamore, Co. Limerick	2000	8.35
Bridgend, Co. Donegal	2000	0.06
Maam Valley, Co Galway	2001	0.28
Shinkeen Stream, Hazlehatch, Co. Kildare	2001	1.13
Bandon River, Dunmanway, Co. Cork	2001	1.35
Suir River, Carrick-on-Suir	2003	6.00
River Nore, Kilkenny	2006	47.00 (provisional)

Source: Engineering Services - Office of Public Works

that a shortfall in expenditure again occurred. The continuing underspend appears to be due primarily to a lack of skilled engineering and administration staff, the requirement placed on the OPW to respond to unforeseen flood emergencies, and the policy of the OPW to spread the budget among a range of works which increased the demand on planning resources. This under spend occurred at a time when responsibilities associated with the management of flood risk were significantly increased. A substantial proportion of engineering and administration resources were re-deployed to advance non-structural programmes which would yield a greater return to the State. While a total of 30

additional staff were identified as necessary to cater for the expansion in OPW's activities post 2004, only 14 were in place at end 2007.

The under-spend has taken place against a background of a significant identified need for flood relief works. The FPRG identified a possible requirement for spending of €440m at 2004 prices over a 10 to 15 year period, which amounts to just under €30m per annum over 15 years. The FPRG's lower estimate of €300m indicates an annual output of at least €20m per annum in 2004 prices. It is clear therefore that, as yet, the Flood Relief Capital Works Sub-Programme has not achieved levels of output required to meet the needs identified in the FPRG's Report.

There is a concern that even if a fifteen year output of projects with a total value of €300m were to be achieved, it might not constitute an effective outcome to the Sub-programme. This is because there is no visibility as to whether expenditure on this scale would exhaust the stock of projects with a high cost-benefit return. Again, if the Sub-programme had been fully set within a full programmatic structure, the need for investment, the appropriate scale of investment and the priorities to be attached to individual projects would have become apparent.

4.2.3 Progress of the Programme in the Period 2005-2007

As indicated above, in the period 2005 to 2007, one scheme - the River Nore (Kilkenny) Scheme - was completed. Some twenty one other projects were advanced and the following highlights the progress made:¹³

Suir River, Clonmel

A revised scheme was exhibited in June 2005 and Clonmel West Scheme was confirmed in Feb 2007. A Flood Warning System has been developed. Detailed design of Clonmel West scheme is underway. In 2007, a contract was placed in the amount of €1.8m for the construction of embankments as part of the Suir River (Clonmel West) Drainage Scheme. These works are now 90 per cent complete

Barrow River, Carlow Town

Public Exhibition of the scheme completed July 2001. Phasing options agreed with local authority. First phase of the flood relief scheme, funded by OPW, will be undertaken by Carlow County Council in conjunction with the separate Carlow Main Drainage Scheme. County Council is currently (2008) examining

¹³ There was very small scale expenditure on other schemes which included compensation payments for schemes already complete.

tenders and will appoint a contractor in the near future. The first phase works in Carlow will cost approx €3.75m. The potential cost of the Carlow Scheme has been greatly reduced through execution of proposed scheme works as conditions of planning approval in private sector development.

John's River, Waterford

Public Exhibition completed April 2002. Agreement has been reached with Local Authority on Scheme progression with an estimated cost of €36.3m. Works will be undertaken in four phases. A Steering Committee of representatives from OPW and Waterford City Council has been established to advance the implementation of the scheme. Agreement has been reached with Waterford City Council to implement the first phase, to protect John's Quay and the properties thereon. Phase I Civil Engineering works were tendered in 2007, and works are expected to commence early 2008.

Ennis, Co. Clare

Scheme is estimated to cost €26 million. Public Exhibition held in October 2005. Detailed design has been underway since mid 2006 and construction of Upper Scheme is expected to commence in early 2008. The procurement process for a civil works contractor commenced in 2007. Construction is expected to take 4 to 5 years, depending on availability of funding.

Munster Blackwater, Mallow, Co Cork

The Scheme will be undertaken in three phases at an estimated cost of €43m. Preliminary Design/Feasibility completed in October 2003. Phase 1 works under Local Authority powers commenced in March 2005 and are now complete.

An advance phase of the Mallow North scheme has just been completed by Cork County Council and funded by OPW. Detailed design underway since mid-2006 with the procurement process for a civil works contractor already underway. Construction of Mallow North scheme is expected to commence in early 2008. Construction is expected to take five years, depending on availability of funding.

Munster Blackwater Fermoy, Co Cork

The Scheme is in three phases at an estimated cost of €32m. Preliminary Design/Feasibility completed in October 2003. Public Exhibition held Nov/Dec 2005. Detailed design has been underway since mid 2006 and construction of Fermoy North scheme is expected to commence in early 2008. Construction is expected to take five years, depending on availability of funding.

Enniscorthy, Wexford

Feasibility and EIS studies ongoing in 2007.

Arklow, Co. Wicklow

A Feasibility Study was completed 2003. This is now being updated with OPW funding. An EIS is also ongoing.

Templemore, Co Tipperary

A Feasibility Report completed in 2007. Exhibition is due to take place in mid 2008.

Mornington, Co. Meath

A Feasibility Report was completed in February 2004. Public exhibition being prepared.

Tullow, Co. Carlow

Pre-feasibility study completed in September 2003. Feasibility Study completed in 2005. EIS is ongoing.

Pilltown, Co Kilkenny

Pre-feasibility commenced in 2007.

Portarlinton, Co Laois

Feasibility study undertaken in 2006. Negotiations with Local Authority on scheme progression underway.

Rye Water, Leixlip, Co Kildare

Planning for this scheme took place prior to 2004. Kildare County Council applied for and received planning approval in accordance with Part VIII of the planning and development regulations for the scheme and works commenced in early 2007. OPW are funding the scheme and are now in the process of completing the civil engineering works on behalf of Kildare County Council by means of direct labour. Works will be completed in 2008.

Limerick (Harry's Mall)

Planning for this scheme took place prior to 2004. OPW funded works by Local Authority in 2005 and 2007.

Tolka, Dublin, Fingal, Meath

The River Tolka Flooding Study was commissioned by Dublin City Council in 2002 as part of the Greater Dublin Strategic Drainage Study, on behalf of OPW and in conjunction with Meath and Fingal County Councils. The Tolka flooding study was underway when the November 2002 flood occurred, with the Final Report being completed in November 2003. A range of recommendations were contained in the Report which included works from upstream of Dunboyne, County Meath all the way to the sea in Dublin City, and were costed at over €30 million.

The OPW agreed in 2003 to carry out most of the works on behalf of the local authorities directly with some of the works being contracted out by the relevant local authorities. In order to expedite the works, each local authority applied for planning approval under Part 8 of the Planning and Development Regulations for works in its respective area. A programme of works was agreed with each of the authorities at the start of every year since in order to have a planned completion of the scheme with the high-risk areas being completed as early as possible.

Since 2003 OPW has expended approximately €15 million, with the majority of the recommended works being now completed. There remains one major item to be completed in the Fingal area which is the replacement of a major bridge in Mulhuddart.

River Dodder, Bray

Feasibility study being undertaken by local authority, with administration and engineering input provided by OPW.

Clonmel

Small scale construction works underway in 2007.

Of the twenty one projects being progressed over this period, eight were at least partly in construction. Table 4.3 presents details of the spending on each Scheme during 2005-2007.

4.2.4 Sub-Programme Effectiveness

The FPRG identified a possible requirement for spending of €440m at 2004 prices over a ten to fifteen year period. This amounts to just under €30m per annum over fifteen years. The FRPG's lower estimate of €300m indicates an annual output of at least €20m per annum in 2004 prices. The Programme's output has so far fallen below these levels and the number of projects completed has been relatively low. There would appear to be a number of reasons for this:

- The natural delays in building up a programme of potential projects in the post 1995 period;
- Difficulties in recruiting and reallocating key personnel, and the redeployment of resources to advance non-structural programmes post 2004;
- The need to involve and secure the agreement of local authorities and other stakeholders in respect of proposed projects;
- The lengthy design and planning processes that OPW are required to adhere to in respect of projects that OPW itself delivers;
- The relative uniqueness of individual projects which hinders the development of standard design solutions and contributes to longer planning periods;
- The delaying of some projects so as to synchronise implementation with other local authority construction works;
- Delays in the construction phase, occasioned by the fact that schemes are carried out on property not in State ownership;
- The adoption of a phasing approach to projects to improve the management of risks and to facilitate a greater spread of projects nationally;
- The lack of a clear project prioritisation process which means that OPW planners can be diverted to ad-hoc projects, creating undue delays in projects that are approaching the implementation stage. This also means that elements of some projects have to be revisited to bring them up to date before planning is finalised.

It is the view of the consultants that the major reason why the output of the Sub-programme has fallen below expectations in recent years is because of human resource constraints, which has led to the absence of a "shelf" of projects brought to an advanced stage of planning. Other factors within the control of OPW, such as the decision to adopt a phasing and geographical spreading of projects were contributory factors.

Table 4.3: Expenditure by Scheme, 2005-2007

Scheme	Expenditure in 2005 €000	Expenditure in 2006 €000	Projected Expenditure in 2007 €000
River Nore Kilkenny City	5,127	517	616
River Suir Clonmel	422	930	1813
Mallow Flood Relief Scheme, Co Cork	1,782	482	504
Strategic Information Dev Programme	2,868	2,477	4135
Spencer Dock		2,400	
Dublin Coastal Study (& Projects)			3040
River Dodder		1,300	1888
Cork City		158	
Fermoy Flood Relief	129	282	110
Fergus River, Ennis	337	320	255
Templemore	146	30	
Mornington River	Neg.	Nil	
Tolka River (Dublin City Area)	1,636	1,177	1720
Tolka River, Fingal Area	878	30	438
Tolka River (Meath area)	1,755	2,608	536
John's River Waterford City	neg	57	5000
River Barrow Carlow Town		12	2114
Slaney, Tullow	38		30
Portarlinton		177	
Rye Water (Kildare)		Nil	644
Slaney, Enniscorthy	26	14	
Boulic Stream, Clonmel		750	
New Ross		400	
Other Projects	251		19
River Suir Carrick-on-Suir	151	57	8
Arklow	150	Nil	59
Tullamore			
Piltown, Co Kilkenny			
Ongoing Compensation	168	45	193
Shannon			
Harry's Mall Limerick	300		
TOTALS	16,167	14,223	23,122

Source: Engineering Services - Office of Public Works

Government has allocated a budget of €50m for 2008. The rapidly increasing budget allocation is a signal that flood relief risk management is gaining importance in terms of the Government agenda. It is important that the OPW responds by quickening the pace of flood relief capital project activity.

4.2.5 Project Durations

The planning and implementation process for flood relief projects is a lengthy one as illustrated by the following sample projects:

- Tolka River: Feasibility study commissioned 2002, work practically complete in Dublin City and County Meath and ongoing in Fingal;
- John's River, Waterford: Public Exhibition in 2002, construction not yet commenced;
- Ennis, County Clare: Public Exhibition 2005, construction to commence in 2008;
- Munster Blackwater, Fermoy: Feasibility Study completed 2003; construction to commence in 2008;
- Arklow, Co.Wicklow: Feasibility study completed in 2003; EIS ongoing;
- Tullow, Co.Carlow: Pre-feasibility study completed in 2003, EIS ongoing;
- Mornington, Co.Meath: Feasibility study 2004, documents for Public Exhibition in preparation 2007;

It would appear that projects are subject to delays both in the planning and implementation phases. With regard to the planning phase, the legislation that guides the OPW requires that each individual project be approved (confirmed) by the Minister for Finance. Before approval is granted, the OPW is required to serve individual notices to land owners and occupiers of property. This usually involves a quite lengthy process of title searching. Exhibition of the project and EIS is also required. The delays encountered as part of this process are increased by the fact that some projects have to go through this process a second time if the Detail Design stage introduces significant changes to the project. The delays encountered have meant that scheme implementation via the local authority Part 8 route has become an attractive option where land is owned by the local authority.

If projects are to be delivered in a more timely fashion, then OPW cannot rely on the local authority route as this will not always provide a quicker process and the interaction with local authorities can bring its own delays. OPW's own processes will have to be streamlined. The OPW is considering whether the legislative obligation to identify and serve notice individually on land owners should be replaced by a less onerous obligation simply to publicise the project. This is part

of a general review of legislation governing flood relief that is underway in OPW. However, as will be noted in Section 4.3 below, limited progress has been made in this regard to date.

With regard to project implementation and management, the administrative structures within Engineering Services might also need some reform if the implementation of the Sub-Programme is to be speeded up. This is especially the case in view of the enhanced annual budget allocation of €50m, which has now been set. As indicated above, works procurement and implementation of projects is the responsibility of the two Arterial Drainage Maintenance Divisions, which have maintenance works as their prime responsibility. Planning and procurement of design consultancy is subject to the overall management of the Administration Section with the technical support of the Flood Relief and Flood Risk Management Services Division. There is a need for OPW to consider whether a dedicated and more integrated project planning, and implementation team should be established with a clear brief of driving the capital programme forward.

The OPW has experienced difficulties in recruiting the skilled resources necessary to administer both the Flood Relief Capital Works Sub-Programme and the Flood Policy Implementation Sub-Programme. As a short term measure and temporary measure, the OPW should consider augmenting its planning and administrative staff through the procurement of project management consultancy resources. As the full complement of 30 additional staff is reached, these additional resources could be discontinued.

4.2.6 Programming Structures

The Flood Relief Capital Works Sub-Programme is not a fully specified programme in that clear priorities, budgets, targets and timelines are not set at the outset. It is notable that while the Flood Policy Implementation Sub-Programme was put on such a programmatic footing consequent to the FRPG report, the Capital Works Sub-Programme was not. While it is recognised that delays in delivering projects arise from issues outside OPW's control, there is a danger, without such a detailed programmatic structure, that there will be insufficient focus on delivering projects in a speedy fashion. Lack of such a structure with clearly established priorities also leaves the Sub-Programme open to change.

While any prioritisation system would have to be sufficiently flexible to allow it to accommodate changed circumstances, a fixed and fully specified programme of works would ensure that unforeseen projects would require more detailed justification or an overt political decision. This is not a trivial issue, as diversion of resources to cater for unforeseen schemes means delays to the planning and

implementation of existing schemes and in some cases duplication of planning activities, as plans require revision because of the time that has elapsed.

4.2.7 Project Prioritisation Process

Currently, projects are subject to appraisal, so that only those projects that yield net economic benefits are progressed. However, projects are prioritised in an informal manner, using judgement and accumulated experience. In Section 2, reference was made to the recommendation of the FPRG that future expenditure in the area of flood relief should satisfy strict prioritisation criteria. In time, the increased use of Catchment (i.e. river basin based) Flood Risk Management Plans (CFRMP) should greatly improve the objectivity and transparency relating to the prioritisation of schemes.

Under the new EU Floods Directive, national Governments will be required to examine the full national territory, to examine where significant flood risk exists or where it is likely to exist in the future (e.g. due to development). For those areas at significant risk, the authorities will be required to produce flood maps and a flood risk management plan. These plans will be developed through the use of Catchment Flood Risk Assessment and Management (CFRAM) studies.

Since flood relief projects are generally most justified in areas where there is a significant risk of flooding events, it is expected that with the completion of all of the necessary CFRAMs by 2015, most flood relief schemes will be implemented in areas that have been the subject of CFRAM studies. The CFRAM studies will greatly aid the prioritisation of projects because the study methodology inherent in CFRAMs includes the collection and analysis of data that allows each potential project in the catchment to be the subject of a multi-criteria appraisal. The appraisal can be made consistent between not only the other projects in a given catchment, but also between other projects in other catchments. Thus, all projects in all catchments can in time be prioritised according to this objective and transparent procedure. This differs from the traditional approach, where a given project is nominated for consideration not only on the perceived degree of flood risk relative to other areas, but also by other factors such as the severity and impact of recent flooding events, requests by local authorities or political representations. Such potential projects are subjected to feasibility studies, including CBAs, and must deliver a positive return in order to progress. However, it is possible that other more pressing projects, that would deliver still greater benefits, may be considered as less of a priority

Although CFRAM will in time allow for greatly improved identification, selection and prioritisation of projects, the necessary studies of all areas of the country deemed to be at significant risk will take some years to complete. In the

interim, an improved prioritisation system that seeks to make the best use of existing data and resources is required, and needs to be in place. Such a system should seek to fulfil at the least the following criteria:

- An assessment of flooding risk that takes account of the likelihood of recent events reoccurring within a short timeframe
- An assessment of the scale of the impact of such flooding. This is particularly important in terms of the likely effect in areas of dense population and high commercial sensitivity.
- Quantification of the lives that may be at risk in the event of certain flooding events
- A multicriteria analysis that seeks to incorporate such items as a CBA, and also tries to facilitate comparisons between the likely benefits to cost ratio of a number of different projects so that they can be prioritised.

While it is acknowledged that in many instances the data available for the appraisal of projects may be incomplete, there is also widespread expertise within Engineering Services that could be drawn upon to augment formal studies.

The OPW has taken initial steps in this regard. A Flood Risk Indicators, Methods and Datasets Scoping Study is underway. This will provide indicators of flood risk that will inform option selection and project appraisal and prioritisation. It is to follow up this study with the development of a formal project prioritisation system.

4.2.8 Value for Money in Programme Delivery

The OPW has adopted a value-for-money approach to flood risk management. At the broad policy level, the emphasis on non structural and preventive initiatives is aimed at reducing the need for capital works and implementing more efficient solutions. It also embraces a river basin-wide approach that recognises the interaction of different elements both with and across water bodies. It also takes a long view so that long term efficient solutions to flood risk management are likely to arise.

At the level of individual capital projects also, there are a number of ways in which OPW seeks to obtain value for money:

- The project appraisal process employed by the OPW means that projects that provide poor value for money are rejected. It also incentivises project planners to look for low cost, and not necessarily structural approaches, to reducing flood risks. The relatively low cost of many projects is noteworthy in this regard;

- The OPW is adopting a flexible approach to the achievement of Flood Risk Management objectives requiring structural works. Where the opportunity arises, planned works are incorporated into private developments through the Planning and Development process in consultation with Local Authorities e.g. Carlow, the Tolka, Tullamore and Bray.
- The possibility of recouping some of the cost of OPW funded schemes from future beneficiaries through development levies is also being pursued in co-operation with Planning Authorities e.g. Portarlington, Mallow.
- The opportunity is also being taken where it arises to try to synchronise flood defence works through other public infrastructure works e.g. roads, water, sewerage, to achieve savings through combining measures and/or economies of scale, e.g. Carlow, Arklow, New Ross.

While the above approaches suggest that value for money is being achieved within the context of the Sub-Programme, they are not conclusive evidence that this is the case. Such evidence would require the undertaking of post project reviews, which would assess *inter alia* the benefit-cost ratio in the light of outturn capital costs. It is recommended elsewhere in this report that such post project reviews be undertaken.

4.3 The Flood Policy Implementation Sub-Programme

As outlined in Section 2.3, the OPW received permission from Government to pursue the OPW Implementation Plan for the new Government policy on flood management in March 2006. The Implementation Plan submitted for approval in June 2005 provided detailed costings and time-targets for each programme. These targets were set out in a revised Implementation Plan in March 2006; new cost estimates were not provided in this plan.

The table below sets out the expenditure to date on each programme, the time targets set out in the revised Implementation Plan of March 2006, and also provides an update on the progress to December 2007. A more detailed assessment is contained in Appendix 1.

All fifteen work programmes have commenced. Six of the programmes have not yet incurred significant expenditure, with staff undertaking initial preparatory work. As Table 4.4 indicates, the work programmes are generally lagging behind the targets set.

The delays in implementing the work programmes would appear to derive largely from staff shortages. In the original implementation plan to support the FPRG, it was estimated that 59 additional staff would be required to support the

additional flood policy work programmes. In the event, only 30 staff were sanctioned by the Department of Finance. Of the 30 staff approved, fourteen were in situ by end 2007. Recruitment has been hampered by the level of experience and specialist skills required, the tight labour market in engineering professionals, and the need to co-ordinate the recruitment process with the ongoing efforts at decentralisation.

An additional factor has been the ambitious nature of the targets set. In retrospect, the difficulties in initiating and resourcing what was a step change in OPW's level of activity in relation to flood risk management were underestimated.

Finally, substantial work on some of the work programmes must await the completion of others, as the outputs of the latter are necessary inputs to the former.

The Flood Policy Implementation Sub-Programme is the prime vehicle by which the aspirations of the FPRG report to focus on non-structural interventions will be delivered. For the reasons indicated above, progress has been limited in this regard to date.

Table 4.4: The Flood Policy Implementation Work Programmes

Year	Work Programme Expenditure to end Dec 07	Progress To Date	
	WP 1: Flood Studies Update	€685,492	Original completion target of early 2008. Programme approximately 60% complete at October 07 (completion scheduled: early 2009).
	WP 2: Strategic Hydro-Meteorological Review	€28,783	Research and Review Process was originally to take place during 2006. Review completed in 2007.
	WP 3: Research and Development Programme	€0	This Programme will be ongoing throughout the period of policy.
	WP 4: Flood Hazard Mapping Programme	€5,900,757	Phase I of the Programme completed. Website live and updated continuously. Phase 2 takes place in line with prioritization of studies in WP5.
		*Includes €2.1m for OSI Licence.	
	WP 5: River Basin (i.e. Catchment) Flood Risk Management Planning Programme	€1,816,501	The whole series of 26 catchment based studies were originally to have been done by 2011. This is now likely to be 2014. The Floods Directive requires completion by 2015.

Table 4.4: The Flood Policy Implementation Work Programmes

Year	Work Programme Expenditure to end Dec 07	Progress To Date
WP 6: Flood Forecasting and Warning Programme	€207,757	Rivers Blackwater and Suir Initial system operational in 2006 - Preferred (final) system will be operational: in 2008
WP 7: Flood Emergency Response Development Programme	€173	Multi phase project involving research & review; template plans and issuance of guidance. Appears to be On track for 08 delivery.
WP 8: Public Awareness and Preparedness Programme	€19,622	National Campaign launched 2005.
WP 9: Planning and Development Management Programme	€15,974	Target times appear to have slipped from 06/07 to 08
WP 10: High Risk Channel Designation Programme	€0	A draft document identifying issues and options for Designation of High Risk Channels and Structures has been prepared and is currently under consideration internally. Asset Register: Existing data identifying drainage works in Schemes and Drainage Districts will be adapted for use as the basis of an asset register for this project.
WP 11: Prioritisation Systems	€0	High priority programme. Policy proposal including research, option development; testing, review and development of draft policy was to be implemented by mid 2006. This does not appear to have happened as the current status appears to be that Multi-Criteria Analysis tested under Tullamore Study, with broad-scale application to be tested under Lee and Dodder CFRAM Studies - Research study to be commissioned to identify risk and benefit indicators and methods for use
WP 12: Asset Management Programme	€0	Phase 1 - Flood Defence Asset Database – Substantially complete: May 2007.
WP 13: Review of Legislation	€0	-Review has commenced but progress is slow pending filling of vacancy. It was originally due to have been completed in 06. The new EU Floods Directive will impose a new deadline for completion of review and necessary legislation if any.
WP 14: Communications Programme	€135,329	Programme is ongoing
WP 15: OPW Flood Response Programme	€0	Draft plan developed, currently being reviewed. Emergency equipment purchased, Information supplied to Dept Of Defence in relation to plant and equipment. OPW liaises with Multi Agency Response to Flood Emergency.

4.4 Conclusions

The Flood Relief Capital Works Sub-Programme has not yet reached the levels of activity identified as necessary in the Flood Policy Review Group report. There is also a tendency for capital budgets to be under spent.

There are a number of reasons for these outcomes. These include manpower deficiencies, the diversion of OPW resources to deliver urgent unforeseen projects and the relatively lengthy design and planning process for what are in many cases relatively low budget capital projects.

There is a need to embed capital projects in a more fully specified programme structure and to introduce a project prioritisation system urgently.

OPW should consider whether a dedicated integrated project planning and implementation team should be established with a clear brief of driving the capital programme forward. Legislation to enhance the powers of the OPW in line with current responsibilities and which may streamline OPW project planning processes should be given the highest priority.

As a short term measure and temporary measure, the OPW should consider augmenting its planning and administrative staff through the procurement of project management consultancy resources.

While there are concerns about the effectiveness of the Flood Relief Capital Works Sub-Programme, there is less concern about its efficiency. The OPW adopts a number of approaches to project planning and implementation that promote value for money. These include a focus on non-structural initiatives, a strong project appraisal process and the synchronisation of projects with other local authority construction works.

The Flood Policy Implementation Programme has, in general terms, been slow to meet the targets set for it and delivering on the objective of putting in place non-structural solutions to flood risk management. This is due to delays in obtaining sanction for the Programme Implementation Plan and in recruiting the personnel necessary to advance the Programme elements. It would also appear that relatively ambitious targets were set at the outset. As significant additional personnel continue to be recruited, it may be expected that the Programme will begin to deliver in a more substantial fashion in the short term.

5. Capital Project Planning and Implementation

5.1 Introduction

The previous sections of the Report have identified the project planning and implementation process as contributing to delays in implementing the Flood Relief Capital Works Sub-Programme. This Section of the Report reviews these processes in the light of the Department of Finance Guidelines, which are summarised in Appendix 2.

5.2 The Current Project Planning Process

5.2.1 Introduction

Project planning usually encompasses a number of key stages as follows:

- Project conception;
- Project feasibility;
- Project design;
- Project procurement; and
- Project implementation.

Project appraisal normally takes place at stages throughout this process and public consultation is undertaken as appropriate.

The current project planning and implementation processes of the OPW are discussed under these headings. A feature of the discussion is that while good planning processes are normally followed by the OPW, not all elements of the planning process are always present. There is thus a need to for OPW to formalise and enforce these planning processes, irrespective of the origin of the project or the implementation route adopted. This need has been recognised within OPW, and various initiatives are being undertaken to improve planning and implementation processes.

5.2.2 Project Conception

The need for a flood relief project may arise from the internal analyses of the OPW, from the local authorities, or from the political environment. With regard to the latter a major flooding event may create an urgent political demand for action. The need for the project is assessed by the OPW before project planning commences, through a **Preliminary Assessment**. However, this is not always implemented in a formal fashion.

There is a case for the introduction of a formal project brief into this process. This would assess the need for the project and identify key objectives. This would not only provide clarity for the project planning process, but would also present an opportunity to assess whether a project should be prioritised on foot of a recent flood event or whether a longer term view is relevant.

5.2.3 Project Feasibility

Project feasibility is normally assessed in two stages. A **Pre-Feasibility** report is commissioned either internally within the OPW or from consultants. A central aspect of pre-feasibility is to confirm that structural interventions are appropriate and feasible. A second element in the report is a preliminary cost-benefit. Based on the number of potential beneficiaries of the project a benefit envelope in monetary terms is developed and the scale of capital works that could be justified is determined. Based on this analysis, a decision is made as to whether a capital project would provide a value-for-money solution. If a decision is made to proceed, a **Full Feasibility** report is commissioned. The Full Feasibility report considers and appraises a number of options, including the do-nothing option. A preferred option is identified and an **Outline Design** is developed. At this stage preliminary site investigation and hydrological investigations are carried out to inform the preliminary design. A preliminary Environmental Impact Statement is drawn up and a more substantial cost-benefit analysis [of the preferred option] is undertaken.

The next stage in the process depends on whether the project is to be advanced under the 1945 Act or by the local authority under Part 8. If the former is the chosen approach, then the project goes through an **Exhibition Stage**. At this stage, the affected property owners must be identified and consulted. Each land owner must receive a notice of the impact of the proposed project on their property. Documents showing the proposed works and the impacts on individual property owners are prepared and placed on exhibition for three to four weeks.

5.2.4 Confirmation Stage

Once the Exhibition Stage is complete, the traditional approach was then to proceed to **Confirmation Stage**. Under the terms of the 1945 Act, the project must then be submitted to the Minister for Finance for approval. Once approved, the project must then be commenced. This means that projects are committed before detailed design is carried out. This is unsatisfactory on a number of counts. Firstly, project costs are estimated in a situation where full information on the project design is not in place. This can lead to apparent cost overruns for a project, where the reality is that the scope of the project changed after the detailed design stage. Secondly, as the project is effectively committed, there is the possibility that if project costs escalate after the detailed design and

procurement stages, then projects that have a poor economic rate of return could be undertaken. The OPW has reformed this approach. It has decided to defer the Confirmation stage to post procurement when a ministerial decision can be made in light of the full facts about the project. This would also mean that a commitment to proceed would not be made until after the full costs of the project are known.

5.2.5 Detailed Design

The traditional project planning approach involved moving from the Confirmation Stage to Detailed Design. As the term indicates, this involves taking the outline design and working out every aspect of the Project in detail. This includes more detailed site inspection and hydrological analysis, together with extensive consultations with stakeholders.

Following detailed design, a decision is made to carry out the works by OPW direct labour or by contractor, and procurement of civil engineering contracting services commences.

5.2.6 Procurement

The OPW engages in procurement not only of civil engineering contracting services, but also of procurement of advisory services in relation to pre-feasibility, feasibility, detailed design and construction contract management. Procurement normally takes the form of separate feasibility/design and construction contracts, although some projects employ direct labour.

Procurement of pre-feasibility, feasibility and detailed design studies is on a fixed price basis. It is the practice of the OPW to procure these studies as an integrated package from a single consultant. This ensures continuity of approach to design and avoids costs associated with “relearning” of the parameters of the project.

With regard to construction contracts, these have traditionally been procured on a re-measurement rather than fixed price basis. This has reflected, in part, the fact that flood relief projects are subject to particular risks at the implementation stage. This arises, for example, where land owners refuse access to their land to civil contractors. In such circumstances, the OPW has traditionally taken the view that these situations require careful management, if goodwill on the part of land owners to flood relief projects is to be maintained. This process can result, from time to time, in delays to projects. Similarly, to some extent, working in water can result in technical and operational difficulties that cannot be anticipated in advance and that are costly to address. Fixed price contracts would result in contractors bearing the burden of such delays and additional costs.

These risks would then be priced into the construction contract by bidders, raising the cost to the Exchequer.

The Department of Finance in its circular of the 27 October 2006 directed that new forms of construction contracts for public works should be employed by public bodies with effect from the 19th February 2007.¹⁴ The essence of these revised contract arrangements is that fixed price lump sum contracts are to replace re-measurement contract for projects in excess of €5m in value. The OPW is committed to implementing a fixed price approach and, for the later phases of projects in hand, the design consultants are being converted to a fixed price regime and the works will be implemented under the terms of the Department of Finance circular.

5.2.7 Part 8 Planning Processes

As indicated above, OPW opts to deliver some projects via local authority processes. This uses the public consultation mechanism under Part 8 as an alternative to the Exhibition Stage and the delays than can be associated with it. A Part 8 approach is especially useful where it is envisaged that land owners will be compliant and or where the local authority is in ownership of the lands affected. In this situation, projects can proceed subject to Council approval only. This approach also facilitates buy-in from local politicians so that late objections to the project can be avoided. Procurement rules for local authorities are also slightly less onerous, so that this phase of project planning can also be somewhat expedited.

5.3 Project Appraisal and Project Planning

The Department of Finance Guidelines require that projects over €5m in value be subject to both a preliminary and detailed appraisal (see Appendix 2). For projects in excess of €5m but not exceeding €30m this can take the form of a multi-criteria analysis. However, projects in excess of €30m require a cost benefit analysis. Projects in excess of €30m and a representative 5 per cent sample of all projects should be subject to ex-post appraisal.

The OPW was to the forefront in applying cost-benefit analysis in Ireland. While procedures for CBA have been applied to the appraisal of schemes for over fifty years, a formal procedure was adopted in the early 1970s. This procedure was used largely to assess the economic return to schemes of arterial drainage, principally by contrasting the increase in the value of agricultural land with the capital costs of the scheme. The environmental impact of such schemes was considered separately through environmental impact assessments.

¹⁴ Department of Finance Circular 33/06.

In the 1990s, the need for a programme of investment in schemes of urban flood relief became apparent. There was a requirement to subject the schemes within this programme to a CBA appraisal. It was recognised that the benefits of flood relief schemes were different in nature to those arising in respect of arterial drainage schemes. In particular, there was a need to assess the benefits both to residential and commercial property in terms of damage avoided and to residents in terms of improved safety and health. The first scheme appraisal suggested an approach to valuing these benefits, and this approach was largely followed in subsequent appraisals.¹⁵ This approach was in part based on research conducted in the UK - the FLAIR report.¹⁶ The cost-benefit methodology was reviewed and revised in 2001.¹⁷

The OPW exceeds Department of Finance requirements in relation to project appraisal in that all major projects, including those below the €30m threshold, are subject to a cost benefit analysis (CBA). This is undertaken at Feasibility stage and confirmed at Confirmation stage. The use of CBA at feasibility stage is to determine whether a project would be cost-beneficial and the extent of the capital cost that would be justified. At the design stage, it is used to confirm that the proposed project approach continues to exhibit an adequate rate of return. OPW is currently undertaking research to expand the project appraisal methodology to embrace a multi-criteria approach that take account of project benefits that cannot easily be captured in monetary terms.

With regard to Ex-Post Reviews, the OPW will need to initiate this process for all projects in excess of €30m and to one in twenty of the remaining projects.

5.4 Improving the Project Planning Process

The planning process set out above is broadly compliant with Department of Finance Guidelines. However, it would appear that it is not always fully adhered to in all cases. This is partly because projects can arise in an ad hoc fashion because of flooding episodes. The dual approach to project planning - via OPW legislative procedures and local authority Part 8 procedures - is also a factor here. There is a need for OPW to formalise project planning procedures through a detailed project planning and implementation manual, which would be applied to projects in excess of €5m capital value. This manual would form the basis of all project planning and implementation, while recognising the different OPW

¹⁵ Economic Evaluation of a Flood Relief Scheme at Sixmilebridge, Co. Clare – Goodbody Economic Consultants, 1996

Flood Loss Assessment Information Report – FLAIR, Flood Hazard Research Centre, Middlesex Polytechnic, 1990.

¹⁷ A Review of Cost Benefit Procedures for Flood Relief Schemes. – Goodbody Economic Consultants, 2001

and local authority project implementation pathways. It would clearly identify project stages and decision points and the reports that would be required before each decision is made. It is understood that the OPW is currently giving consideration to the development of such a manual.

Good project planning procedures would suggest that a formal Business Case approach be used to inform decision-making. This could be prepared initially at the Feasibility Stage and expanded and updated at the Design and Procurement Stages. It could include the following elements:

- Identification of need for the project;
- Analysis of need;
- Objective setting;
- Design and appraisal of options;
- Budgeting and costing;
- Risk assessment of preferred option;
- Procurement of the project, and
- Proposals for implementing the project

5.4.1 Risk and Scope Management

Perhaps the largest gap in current OPW planning and implementation procedures is the absence of an overt and formalised risk management process. Although project risks are considered by the planning team, there is need for a more formal risk management approach that contains the following elements:

- Risk identification and classification;
- Risk assessment and quantification;
- Risk response planning; and
- Risk monitoring and control.

Risk assessment could then be used to inform estimates of contingency costs.

5.5 Project Implementation

As indicated above, the project is usually implemented by a contractor or by OPW direct labour. A Resident Engineer is usually appointed from either OPW, the local authority, or a consultancy firm. The project management procedures would appear to vary somewhat from project to project. A formal project steering group is not always established, although this is a requirement of the Department of Finance Guidelines. Given that even where the local authority implements the project, it does so with OPW funding, the OPW should ensure that routine project management procedures are adhered to. In particular, there is a need for more formal project monitoring reports. The OPW should devise a

standard format for regular project monitoring reports, which would include ongoing risk assessment and identification of potential changes in project scope.

5.6 Conclusions

Good project planning processes are normally followed by the OPW. However, not all elements of the planning process are always present. There is thus a need to for OPW to formalise and enforce these planning processes, irrespective of the origin of the project. This need has been recognised within OPW, and various initiatives are being undertaken to improve planning and implementation processes.

There is a need for OPW to formalise project planning procedures through a detailed project planning and implementation manual, which would be applied to major projects. This manual would form the basis of all project planning and implementation, while recognising the different OPW and local authority project implementation pathways. It would clearly identify project stages and decision point and the reports that would be required before each decision is made. It is understood that the OPW is currently giving consideration to the development of such a manual. Good project planning procedures would suggest that a Business Case approach be used to inform decision-making.

There is a case for the introduction of a formal project brief into this process. This would assess the need for the project and identify key objectives. This would not only provide clarity for the project planning process, but would also present an opportunity to assess whether a project should be prioritised on foot of a recent flood event or whether a longer term view is relevant.

The OPW exceeds Department of Finance requirements in relation to project appraisal in that all major projects, including those below the €30m threshold, are subject to a cost benefit analysis (CBA). With regard to Ex-Post Reviews the OPW will need to initiate this process for all projects in excess of €30m and to one in twenty of the remaining projects .

6. Performance Indicators

6.1 Introduction

This Section of the Report reviews the targets set for the Programme and the performance indicators in use. Recommendations for additional performance monitoring are made.

Normally, performance indicators comprise the following:

- Input indicators: these refer to the resources used;
- Output indicators: these refer to activity levels;
- Result indicators: these relate to direct and immediate effects; and
- Impact indicators: these refer to consequences beyond the immediate effects and direct beneficiaries.

The use of these indicators was assessed separately for the Flood Relief Capital Works and the Flood Policy Implementation Sub-Programmes.

6.2 Performance Indicators and the Flood Relief Capital Works Sub-Programme

As was indicated above, in the post 2004 period an implementation plan for the Flood Policy Implementation Sub-Programme was developed. However, presumably because capital works have been on-going since the 1995 Act, a similar implementation plan for capital works was not established. As a result, long term targets and performance indicators have not been set for this Sub-Programme. It is a principal recommendation of this report that such an implementation plan with timelines and budgets for the delivery of capital projects be set.

The Engineering Services Business Plan sets out *annual* targets for the year ahead. The targets set relate to advancing the planning and implementation of capital works. For example, the 2007 Business Plan set two targets as follows:

- Advance four major relief schemes to construction stage;
- Bring three major relief schemes to Public Exhibition.

This Implementation Plan for this Sub-Programme should build on these performance indicators as follows.

Input indicators: The Plan should set out anticipated annual spend and number of person-years to be devoted to the Sub-Programme.

Output indicators: an output indicator based on the stages of the planning and implementation process should be established. These stages are pre-feasibility, full feasibility, Exhibition, Confirmation, under construction; and completion. The Plan should set targets for the numbers of projects brought to each stage over the period of the Plan as a whole and annually.

Result and Impact Indicators: an obvious result indicator is the number of households and businesses benefiting from flood relief projects. The use of such simple indicators would, when compiled annually, provide an overview of progress in relation to the impact of flood relief projects. Consideration could be given at a later stage to nuancing such indicators to reflect the degree of flood risk alleviated and the nature of the risks avoided.

Other impact indicators which attempt to e.g. assess the reduction in damage as flood risks are reduced would require an estimate of the reduction in the number of actual flooding events consequent to the Programme. Given the intermittent and random aspect to flood events, this would not be an accurate indicator, even if the measurement problems associated with it could be overcome.

6.3 Performance Indicators and the Flood Policy Implementation Sub-Programme

This Sub-Programme has an Implementation Plan which sets out the anticipated expenditure under each Work Programme over the period 2005 to 2011 with an indicative estimate for the post 2011 period. As the work of the OPW now includes this Sub-Programme as a major element, it would be appropriate to recast the sub-heads under which expenditure is reported to reflect this reality.¹⁸ The Plan also provides resource indicators in the form of number of personnel required. Again, it would be useful to establish person-years of activity as an input indicator.

The Plan also sets out output indicators in the form of events such as the completion of reports or the installation of new systems. These are then subject to deadlines. This is an appropriate approach. However, when progress is reported annually, the indicators considered are sometimes not precisely those previously specified. There is a need to be consistent in the specification and use of these output indicators.

It is considered that result and impact indicators are not generally applicable to this Sub-programme as it is essentially a support rather than an end product delivery programme. However, impact indicators could be developed for some work programmes, for example in respect of flood awareness and

¹⁸ At present, expenditure is reported under three sub-heads as follows: H1: Hydrometric and hydrological investigation; H2: Flood Relief projects; H3: drainage –maintenance.

education initiatives. These could be based on market research studies that test people's levels of awareness and understanding.

7. Conclusions and Recommendations

7.1 Conclusions

7.1.1 Overall

The Flood Risk Management Programme has changed the emphasis of the work of the OPW to include non-structural as well as structural interventions aimed at minimising flood risks. It also embraces a proactive and catchment based approach to achieving this goal. This is likely to prove an effective and efficient approach to flood risk management in the long run. It is in keeping with strategy enunciated in the 2007 EU Floods Directive.

The Flood Risk Management Programme and the approach adopted within that Programme has been confirmed in a number of Government policy statements. Research and analysis undertaken has also confirmed the reality of climate change and the prospects for increased levels of flooding over the next fifty years when compared to the past. The Flood Risk Management Programme thus remains a highly relevant initiative.

7.1.2 The Flood Relief Capital Works Sub-Programme

The Flood Relief Capital Works Sub-Programme has not yet reached the levels of activity identified as necessary in the Flood Policy Review Group report. There is also a tendency for capital budgets to be under spent.

There are a number of reasons for these outcomes. These include manpower deficiencies, the need to engage stakeholders, the diversion of OPW resources to deliver unforeseen projects and the relatively lengthy design and planning process for what are in many cases relatively low budget capital projects.

The Flood Relief Capital Works Sub-Programme is not a fully specified programme in that clear priorities, budgets, targets and timelines are not set at the outset.

While there are concerns about the effectiveness of the Flood Relief Capital Works Sub-Programme, there is less concern about its efficiency. The OPW adopts a number of approaches to project planning and implementation that promote value for money. These include a focus on non-structural initiatives, a strong project appraisal process and the synchronisation of projects with other local authority construction works.

Good project planning processes are normally followed by the OPW. However, not all elements of the planning process are always present. There is a need for OPW to formalise project planning procedures through a detailed project planning and implementation manual, which would be applied to major projects.

There is a case for the introduction of a formal project brief into this process. This would assess the need for the project and identify key objectives. This would not only provide clarity for the project planning process, but would also present an opportunity to assess whether a project should be prioritised on foot of a recent flood event or whether a longer term view is relevant.

Good project planning procedures would suggest that a formal Business Case approach be used to inform decision-making.

Long term targets and performance indicators have not been set for the Flood Relief Capital Works Sub-Programme.

The OPW exceeds Department of Finance requirements in relation to project appraisal in that all major projects, including those below the €30m threshold, are subject to a cost benefit analysis (CBA).

7.1.3 The Flood Policy Implementation Sub-Programme

The Flood Policy Implementation Sub-Programme has, in general terms, not met the targets set for it. This is due to delays in recruiting the personnel necessary to advance the Programme elements. It would also appear that relatively ambitious targets were set at the outset. As additional personnel continue to be recruited, it may be expected that the Programme will begin to deliver in a more substantial fashion in the short term.

While output indicators and targets have been established for the Flood Policy Implementation Sub-Programme, there is a need for greater consistency in their use.

7.2 Recommendations

- There is a need to embed capital projects in a more fully specified programme structure;
- Current efforts to introduce a project prioritisation system in advance of completion of the CFRAM studies should be expedited.
- OPW should consider whether a dedicated project planning and implementation team should be established with a clear brief of driving the capital programme forward;

- As a short term measure and temporary measure, the OPW should augment its planning and administrative staff through the procurement of project management consultancy resources.
- Legislation to streamline OPW project planning processes should be given the highest priority;
- There is a need for OPW to formalise project planning procedures through a detailed project planning and implementation manual, which would be applied to major projects;
- Good project planning procedures would suggest that a Business Case approach be used to inform decision-making for major projects;
- With regard to Ex-Post Reviews, this will need to be extended to all projects in excess of €30m and to one in twenty of the remaining projects;
- A set of input, output and result/impact indicators should be developed for the Flood Relief Capital Works Sub-Programme;
- The output indicators for the Flood Policy Implementation Sub-Programme output indicators should be clearly specified and employed in a consistent fashion.

Appendix 1: Implementation Plan and Targets Flood Policy Implementation Sub-Programme

Implementation Plan and Targets Flood Policy Implementation Sub-Programme

Year	Time Target of March 2006	Progress To Date
WP 1: Flood Studies Update		
Work Programme Expenditure	Constituent Work Groups and Packages commissioned to take place from 06 to early 2008.	- Programme approximately 60% complete (completion scheduled: early 2009)
2005	€141,949	- Seven work-packages complete, or substantially complete, including Met & Hydro data preparation; Rainfall Depth Duration Frequency Modelling; Flood Event Analysis; Urban Scoping Study; IT Scoping Study and development of PROPWET. - Three Public Consultation Workshops held in Galway, Cork and Dublin: end June 2007.
2006	€380,642	
2007	€162,901	
Total	€685,492	
WP 2: Strategic Hydro-Meteorological Review		
Work Programme Expenditure	Constituent Work Groups and Packages: Research and Review Process to take place during 2006, with submission of the Strategic Monitoring Plan to the SG/ICC early to late 06.	Review completed by consultants April 2007 – preliminary draft report submitted. Reviewed by OPW
2005	€0	Draft Final Report submitted July 07. reviewed by OPW. Final report due end October 07
2006	€0	
2007	€8,783	
Total	€8,783	
WP 3: Research and Development Programme Work Programme Expenditure		
2005	€0	- Application made to join the CRUE ERANET Consortium: scheduled to being a Partner by end 2007. - Awaiting developments in UK re FRMRC. - SDF Workshop held in Dublin: April 2007. - Shannon CFRAM Study proposed for INTERREG IVB project, with OPW as lead partner for 'Flood Risk Management Plan' project meetings held in June and September 2007. - Application for INTERREG IVB funding: Spring 2008.
2006	€0	
2007	€0	
Total	€0	
WP 4: Flood Hazard Mapping Programme		
Work Programme Expenditure	Phase I of the Programme was already underway and due for completion mid-2006. Phase 2 takes place in line with prioritization of studies in WP5	- Website live and updated continuously. - Contract GIS Specialist (Grade II level) appointed as Data Administrator: June 2007. As per interview with OPW Staff – system went live in Oct 06 at a cost of €3.0M, close to the €2.9M envisaged cost in 05.
2005	€2,546,387	
2006	€1,607,000	
2007	*€1,747,370	
Total	€5,900,757	
*Includes €705,000 for OSI Mapping Licence. ITP sent to Accounts for Payment.		

Implementation Plan and Targets Flood Policy Implementation Sub-Programme

Year	Time Target of March 2006	Progress To Date
WP 5: River Basin (i.e. Catchment) Flood Risk Management Planning Programme		
	Ph1 Research, Review and Pilot Testing of intl best practice: early 06	The WP 5: Flood Risk Management Planning Programme now composes Lee Catchment
	Ph2 Pilot FRMPs – runs from 2006 into 2007	Dodder Catchment Tullamore Town Suir Catchment
Work Programme Expenditure	In House Slaney Suir	National Programme National Floodplain Survey
2005	€0	
2006	€65,633	Progress to October 07:
2007	€1,450,868	
Total	€1,816,501	Lee CFRAM: - Channel & Structure Cross-Section Survey completed: June 2007. - Completion of Draft Catchment Flood Risk Management Plan: June 2008 (delayed due to late commissioning of cross-section survey, DTM model of Cork City not fit-for-purpose, response delay times within OPW dt to resource availability). Dodder CFRAM: - Ongoing progress. - Completion of Catchment Flood Risk Management Plan: Early 2008. Tullamore FRAM: - Work complete – Awaiting comments from local authority before finalisation of Study Report. Suir CFRAM: - Study initiated ahead of schedule: Three Steering Group meetings held - Channel & Structure Cross-section survey commenced: June 2007. Fingal, East-Meath FRAM: - Commencement of Project which is being undertaken by Fingal County Council with support/advise-review
WP 6: Flood Forecasting and Warning Programme		
	Pilot Studies underway in 2005 and due to be in place in mid 06. Bedding in period required thereafter.	- Suir Catchment (Clonmel): Initial system operational: 2006
Work Programme Expenditure	Establishment of national protocol a priority to be done during 2006 so that pilot studies can operate under this protocol. Information management system to be implemented once National Protocol has been established.	Preferred (final) system operational: 2008 (delayed due to ongoing rainfall logger hardware problems and paucity of data – rainfall data collection continuing additional year). - Munster Blackwater Catchment (Mallow and Fermoy): Initial system operational: 2007 Preferred (final) systems operational: 2008 (delays due to ongoing rainfall logger hardware problems and paucity of data - rainfall data collection continuing additional year
2005	€0	
2006	€17,267	
2007	€0,490	
Total	€07,757	

Implementation Plan and Targets Flood Policy Implementation Sub-Programme

Year	Time Target of March 2006	Progress To Date
WP 7: Flood Emergency Response Development Programme		
Work Programme Expenditure		
2005	Phase 1 Research and Review of Best Practise and development of pilot plans for 3 towns: Clonmel, Mallow & Fermoy from mid 06 to mid 07.	- Stage I (Review of best practice) report completed.
2006	Phase 2: Template of Emergency Response Plans from 2007 to mid 08	- Stage 2 (Pilot studies) underway in Mallow, Fermoy and Clonmel. Ongoing progress.
2007	Guidelines begin to be drafted during Phase 1 and are issued mid 08.	- Draft Flood Emergency Response Plans prepared: end September 2007. - Stage 3 (Guidelines and a Template for a FERP): end December 2007.
Total		Note: WP 7 is the basis for OPW's involvement as a Partner in the extension to NOAH, an INTERREG IIIB Project – a Flood Information and Warning System being developed by NOAH to be tested in the pilot towns.
WP 8: Public Awareness and Preparedness Programme		
Work Programme Expenditure		
2005	Phase 1: General Awareness and preparedness undertaken in 2005 (incl. launch of www.flooding.ie).	- Autumn awareness campaign not now planned, as it would clash with National Emergency Awareness campaign by Govt. early in new year.
2006	Phase 2: Research and Review and appointment of consultants during 2006	- Review of effectiveness of OPW Campaign deferred to early 08.
2007	Phase 3: Risk Awareness/Preparedness and Local Authority workshops 2007.	
Total		
WP 9: Planning and Development Management Programme		
Work Programme Expenditure		
2005	- Research & review underway by 06	- Contract awarded: March 2007.
2006	- Planning and Control Development Guidelines to be prepared, tested and reviewed during 06	- In progress. Initial Public Consultation was held in June. Draft guidelines will be available in June 2008. It is anticipated that the Minister for Environment, Heritage and Local Government will publish these as consultation document leading to issue of a Section 28 direction to Local Authorities to have regard to them.
2007	- Scoping & requirements for other guidelines mid to late 06; with other guidelines to be developed during 07.	
Total		
WP 10: High Risk Channel Designation Programme		
Work Programme Expenditure		
2005	Consultation with stakeholders; develop application form; develop database; and prepare CBA.	- A number of pilot projects are underway, in line with former Minister Parlon's initiative last January.
2006	No timeline	- Some research has been carried out to date and is now being collated.
2007	Develop draft legislation for designated channels & maintenance thereof: 1 year from initiation.	
Total		

Implementation Plan and Targets Flood Policy Implementation Sub-Programme

Year	Time Target of March 2006	Progress To Date
WP 11: Prioritisation System:		
Work Programme Expenditure	High priority programme. Policy proposal including research, option development; testing, review and development of draft policy to be implemented by mid 2006.	- Need for holistic approach – Multi-Criteria Analysis tested under Tullamore Study, with broad-scale application to be tested under Lee and Dodder CFRAM Studies - Research study to be commissioned to identify risk and benefit indicators and methods for use
2005	€0	
2006	€0	
2007	€0	
Total	€0	
WP 12: Asset Management Programme		
Work Programme Expenditure	Phase 1: Asset Management – development of asset register. Takes place on catchment by catchment basis in line with WP 5. Phase 2: Determination of prioritised asset monitoring, maintenance and renewal activities and dissemination of information. Initiated 06/07 and completed by 2011/12	- Flood Defence Asset Database – Substantially complete: May 2007. - Undergoing minor modifications in response to feedback from Regions and shift in software platform.
2005	€0	
2006	€0	
2007	€0	
Total	€0	
WP 13: Review of Legislation		
Work Programme Expenditure	Review to commence early 06 and completed by end 06	- Review has commenced but progress is slow pending filling of vacancy. - EU Floods Directive has been adopted and is expected to be published imminently. Time deadlines will run from date of publication. This will impose a deadline for completion of review and necessary legislation if any.
2005	€0	
2006	€0	
2007	€0	
Total	€0	
WP 14: Communications Programme		
Work Programme Expenditure	Development of strategy in early 2006 with implementation of strategy by end 2006 including: - develop comms strategy - Website maintenance - Database of stakeholders in stakeholder organisations - Dissemination of information	- Flood Risk Management content of OPW Website under preparation to provide significantly enhanced information dissemination - Ongoing provision of presentations and articles - Development of Scheme and Study project updates / newsletters
2005	€0	
2006	€28,910	
2007	€6,419	
Total	€35,329	
WP 15: OPW Flood Response Programme		
Work Programme Expenditure	Development of procedures relating to preparedness and response and recovery Programme to be undertaken in 2006.	- Working Group established to identify issues and direction, including formalisation of existing, informal, arrangements
2005	€0	
2006	€0	
2007	€0	
Total	€0	

Appendix 2: The Public Sector Guidelines

A2.1 The Public Procurement Guidelines

The Public Procurement Guidelines - Competitive Process (July 2004) set out the guidance on public procurement. These incorporate the revised and updated EU procurement directives.¹⁹ The Guidelines describe the different competitive processes to be applied to contracts below and above the EU thresholds.

Road scheme contracts fall generally fall within the scope of the EU Directives: Works contracts in excess of €5,278,000 (exclusive of VAT) are subject to EU provisions.

The EU directives require that contracting authorities:

- Advertise their requirements in the Official Journal of the EU;
- Use procurement procedures that provide open and transparent competition;
- Apply clear and objective criteria, notified to all interested parties, in selecting tenderers and awarding contracts;
- Use broadly based non-discriminatory technical specifications;
- Allow sufficient time for submission of expressions of interest and tenders.

Contracting authorities may choose to award contracts on the basis of lowest price or MEAT (most economically advantageous tender). When MEAT is being used, the notice or tenders documents must contain all of the criteria being used with a weighting. Where this is not possible, the criteria must be ranked. New or amended criteria must not be introduced during the course of the competition. Where additional information is supplied to a candidate, it must be supplied to all.

OJEU notices must be drawn up on standard forms. National notices can also be issued but not before the date of dispatch to the EU. National notices should ideally do no more than refer to the OJEU notice

Contracting authorities with an aggregated procurement requirement in excess of €750,000 may publish an annual notice called a Prior Information Notice (PIN). This is intended as an aid to transparency and for the benefit of suppliers. A PIN allows the contracting authority to reduce the minimum time for tendering.

¹⁹ EU directive 2004/18/EC relating to public sector bodies and 2004/17/ec relating to utilities.

It is a requirement that contracting authorities publish in the OJEU certain information on contracts awarded within 48 days of the award (number of tenderers, value of contract, range of offers, etc.)

There are four procurement procedures:

- Open
- Restricted
- Competitive Dialogue
- Negotiated (exceptional)

These may be summarised as follows:

- Open procedures: all interested parties may submit tenders;
- Restricted procedures: a two stage where only parties that meet minimum requirements are invited to tender;
- Competitive dialogue: contracting authorities advertise their requirements and enter into dialogue with interested parties. This approach is suitable for more complex contracts e.g. public private partnerships;
- Negotiated procedures: involves a limited number of tenderers and is to be used only in exceptional circumstances, such as cases of extreme urgency.

Different time limits for receipt of tenders/expressions of interest apply to the different types of procedure.

Where MEAT is the basis, the contract award must be to the tender that best meets the relevant criteria. A scoring system is recommended. The scoring system must not include “value-for money” – this is the outcome of the process. Abnormally low tenders may not be rejected out of hand without asking the tenderer for the basis for the low bid.

The National Public Procurement Policy Framework published by the National Public Policy Procurement Unit (NPPPU) in the Department of Finance in April 2005 established the core principles to which public procurement policy and practice must conform.

The main aim of national policy is to achieve value for money. Procurement management reform is seen as one of the key strategies in delivering value for money. In this regard, public bodies are required to:

- Include procurement management as one of the key strategic priorities and objectives in their Statement of Strategy

- Develop an annual corporate procurement plan; and
- Arising from the procurement plan develop a plan for significant purchases, where appropriate.

Subsequently, the NPPPU issued a framework guidance for corporate procurement plans and made available consultancy support to public bodies in the development of their procurement plans.

A2.2 Guidelines for Tax Clearance

A Tax Clearance Certificate is a written confirmation from the Revenue that a person's tax affairs are in order at the date of issue of the certificate. The purpose of the Tax Clearance Scheme is to ensure that persons who have benefited from State contracts are compliant with their tax obligations. It is a condition of obtaining a public sector contract of a value of €6,500 or more, within any twelve month period, that the contractor provide a valid certificate.

A2.3 Guidelines for the Appraisal and Management of Capital Expenditure

A2.3.1 General

The guidelines for project appraisal are laid down in the Department of Finance's (DOF) document "Guidelines for the Appraisal and Management of Capital Expenditure Proposals in the Public Sector, February 2005".

A2.3.2 Project Appraisal Process

With regard to project appraisal, the DOF Guidelines require a three-stage process:

Preliminary Appraisal: This aims to assess whether the project has sufficient merit to justify a full, detailed appraisal.

Detailed Appraisal: This aims to provide a basis for a decision on whether to drop or re-scope a project, or to approve it in principle.

The Guidelines recognise that estimates the project costs may change during detailed planning of the project. Where there are significant project cost changes, the detailed appraisal should be updated to reflect these changes.

Post Project Review: This is an assessment of both the project outturn and the appraisal and management procedures used. Project outturn is to include an analysis of whether the expected benefits and outcomes materialised. Appraisals and post-project reviews are the responsibility of the sponsoring agency.

A2.3.3 Thresholds for Project Appraisal

The Guidelines indicate that project appraisal processes should be commensurate with the costs of projects and the degree of complexity of the issues involved. The thresholds and methodologies set out are as follows.

- A simple assessment should be carried out for minor projects with an estimated cost below €0.5 million, such as projects involving minor refurbishment works, fit outs etc.
- Projects costing between €0.5 million and €5 million should be subject to a single appraisal incorporating elements of a preliminary and detailed appraisal.
- A Multi-Criteria Analysis (MCA) should be carried out at minimum for projects between €5 million and €50 million.
- Projects over €50 million should have a Cost Benefit Analysis (CBA) carried out.
- A CBA would also be appropriate for innovative projects costing above €5 million which:
 - Involve complex or specialised issues or untried technology; or
 - Involve issues which have not been previously investigated in-depth; or
 - Are regarded as pilot projects on which larger programmes may be modelled; or
 - Would generate additional substantial ongoing operating or maintenance costs.

Post project reviews are to be carried out for all projects costing in excess of €50m and a representative 5 per cent sample of all completed projects.

A2.3.4 Methodologies

The DOF Guidelines indicate that analyses from a number of viewpoints may be appropriate including:

- Economic analysis;
- Exchequer cash-flow analysis; and
- Financial analysis.

With regard to economic analyses, the Department of Finance indicates that techniques such as multi-criteria analysis, cost-benefit analysis and cost effectiveness analysis may be appropriate. Cost-benefit analyses are required for projects with a capital cost in excess of €50m.

The key difference between cost-benefit and other techniques is the greater emphasis on quantification and monetisation of benefits. Benefits and costs are to be assessed using standard criteria such as Net Present Value (NPV), Internal Rate of Return (IRR), and Benefit-Cost Ratio.

A2.3.5 Programme Appraisal

With regard to programme appraisal, the DOF Guidelines indicate that programmes with an annual value in excess of €50m and of five years or more duration should be subject to prior and mid-term evaluation at the beginning and mid-point of each five year cycle. These are minimum requirements and the Department of Finance may require appraisals to be undertaken in other circumstances.

A2.3.6 Project Management

The DOF requirements are very standard ones for project management, including:

- A Steering Group for the project representative for overseeing it with representatives of both the sanctioning and sponsoring authorities;
- A project co-ordinator responsible for its execution must be appointed;
- A Design Team leader should be appointed for every project with more than one technical consultant;
- The project brief should contain all the requirements of the structures and the services to be provided by engineers, architects etc. It should focus on the minimum requirements to achieve a cost-effective end product;
- Project information should be presented in a format compatible with the National Standard Building Elements and Design Cost Control Procedure;
- Once design has commenced on the basis of the project brief, changes in scope or objectives should not be made unless absolutely necessary;
- If changes are made, the cost implications and the effects on the timing of the project should be fully appraised and the express approval of the Sanctioning authority sought, before an amended brief is given to consultants;
- If designs prove to be too costly, they should be referred back to the consultants to reduce costs. If as a result, scope changes are necessary, then these should be approved by the sponsoring agency;
- An appropriate level of contingency should be built into project costs.
- Pre tender information: when plans and designs have been finalised the project proposal should be reviewed;
- Decision to proceed must await the securing of planning permission;

-
- Tendering should be in accordance with national procurement guidelines or where costs exceed EU thresholds on the basis of procedures set out in Directives 2004/17/EC and 2004/18/EC;
 - Suitable strategies to minimise risk should be put in place.

A2.4 The Value for Money Indicators Circular of January 2006

The objective of this circular was to enhance the value for money procedures in relation to capital and ICT projects. It provided that:

- Fixed price lump sum contracts would become the norm for construction projects;
- A Project Manager should be appointed by sponsoring agencies, with personal responsibility for monitoring of the project and reporting to the project board;
- Ex-ante appraisals including cost-benefit analysis would now be required for all projects above €30m;
- Similarly, post projects reviews are required for all projects above the €30m threshold;
- Separate progress reports for each project to be submitted to the project board;
- Formalised contracts reviews of projects over €30m; and
- Government departments are required to carry out spot checks of projects for compliance with the capital appraisal guidelines.

A2.5 Fixed Price Contracting

The Department of Finance in its circular of the 27 October 2006 directed that new forms of construction contracts for public works should be employed by public bodies with effect from the 19th February 2007. The essence of these revised contract arrangements is that fixed price lump sum contracts are to replace re-measurement contract for projects in excess of €5m in value.